The Impact of Choice Expression Modalities on Choice Rationality and Choice Satisfaction: An Empirical Investigation.

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Vorwort

Diese Arbeit, die während meiner Zeit als Promotionsstudent an der Graduate School for Economics and Social Sciences (GESS) der Universität Mannheim und meiner Tätigkeit als wissenschaftlicher Mitarbeiter am Dr. Werner Jackstädt Stiftungslehrstuhl für Sales & Services Marketing an der Universität Mannheim entstanden ist, wurde im März 2016 von der Fakultät für Betriebswirtschaftslehre als Dissertationsschrift angenommen. Ich möchte nun die Gelegenheit nutzen, um mich bei allen Personen zu bedanken, die mich auf diesem Pfad begleitet und unterstützt haben.

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Thorsten Voß

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List of Abbreviations

ACC *Anterior Cingulate Cortex*
AF *Altered Auditory Feedback*
BC *Bias-Corrected*
BS *Bootstrapped*
CI *Confidence Interval*
CRT *Cognitive Reflection Test*
CS-Index *Choice Satisfaction Index*
EEG *Electroencephalography*
ERN *Event Related Negativity*
FI *Faith in Intuition*
fMRI *Functional Magnetic Resonance Imaging*
NB *National Brand*
NFC *Need for Cognition*
ORC *Objective Rational Choice*
PET *Positron Emission Tomography*
PL *Private Label*
RBP *Ratio Bias Phenomenon*
REI *Rational Experiental Inventory*
RF *Regular Auditory Feedback*

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1 Introduction to the Topic

1.1 Introduction

Life is full of decisions and choices. While some of them are difficult to make, others are ordinary and intuitive. Yet, in both cases individuals are facing various different ways and options to express and to articulate them. For instance, decisions and choices can be expressed orally by talking to another person. Direct interpersonal communication is the cornerstone of human interaction and particularly important for business collaborations (Homburg/Stock 2004; Scarino 2009). From business-to-business relations to ordinary grocery shopping, there are virtually infinite occasions in which individuals can opt to express their preferences, decisions, and choices in a face-to-face conversation (Cox/Cox/Anderson 2005; Homburg/Bornemann/Kretzer 2014). Of course, oral choice expression can also be asserted without the necessity of a face-to-face interaction. For instance, one can call another person to disclose a decision or one can order a pizza via phone. However, there are also many situations in which individuals usually do not express their preferences, decisions, and choices orally by speaking, but rather manually by some form of action. For example, in supermarkets and other stores offering self-service, it is possible to choose items by simply taking them from the shelves. Further, if individuals intend to get an item from a vending machine they only have to push buttons or to turn slots to express their choice and receive what they desire. Eventually, the internet allows individuals to express their decisions and choices via a simple mouse click.

Despite the indubitable fact that a large number of different modalities of decision and choice expression exists, so far research as well as practitioners seem to neglect the potential impact of different modalities of decision and choice expression on decision making and choice. This is particularly surprising as ample studies repeatedly highlight that the process of decision making and the eventual choice is significantly affected by, or even entirely depending on various internal and external factors. For instance, there is evidence that factors such as the context-specific decision situation (e.g., Ratner/Kahn 2002), the valence of individual mood and affect (Garbarino/Edell 1997; Kahn/Isen 1993), the presentation and formation of a

choice set (e.g., Diehl/Zauberman 2005; Kahn/Wansink 2004; Mogilner/Shiv/Iyengar 2013), as well as the contextual induction of perceptions and metaphorical mindsets (e.g., Gu/Botti/Faro 2013; Shiv/Fedorikhin 1999) have an essential influence on the process of decision making and eventually steer the expression of choice. However, whether the modality in which preferences, decisions, and choices are expressed also constitutes a decision making and choice affecting factor and what potential practical recommendations could be drawn from the connection between expression modality and choice, constitute unanswered questions.

In fact, to the best knowledge so far there is only one single initial attempt to explicitly investigate the effect of different modalities of preference expression on choice. In that study, Klesse/Levav/Goukens (2015) imply that the likelihood of making an indulging choice is indeed partly dependent on the modality in which a preference is expressed. This initial work is very insightful as it indicates that a difference in the modality of expressing one's preferences impacts decision making and eventually choice. Yet, as many questions remain unanswered so far this study only constitutes the beginning of a series of research in an entirely new and promising research avenue investigating the impact of the modality of choice expression within the context of consumer behavior.

1.2 Goal and Structure of the Present Dissertation

As many potentially interesting questions still remain unanswered and other important questions are not even raised, this dissertation is intended to further elaborate on the potential impact of different modalities of decision and choice expression.

With regard to the scarcity of relevant studies in this new field of research, this dissertation pursues the *goal to gain more insights into the potential impact of different modalities of choice expression on decision and choice making as well as on the underlying mechanisms for this potential effect*. That is, the present dissertation intends to reach and to fulfill two goals. In their initial study, Klesse/Levav/Goukens (2015) propose that different modes of preference expression might impact how impulsive choices are asserted. More specifically, the authors differentiate between manual and oral preference expression and assume that in contrast to manual preference expression, oral preference expression elicits impulsivity. By studying choice situations comprising a self-control dilemma (e.g., choosing between a tasty,

but unhealthy and a less palatable, but healthy snack) the authors observe that individuals expressing their preferences orally are more likely to choose an indulging over a healthy choice option than are individuals expressing their preferences manually. Although these findings are in line with the presumption that different expression modalities yield different levels of impulsivity, the underlying mechanisms have not been explicitly investigated or proven, yet. Accordingly, the *first goal of this dissertation* is to investigate and quantify the underlying mechanisms for why a difference in the modality of expressing one's choice affects and shapes choice.

Secondly, as mentioned before the study of Klesse /Levav/Goukens (2015) constitutes merely the first attempt of investigation in the research field of expression modality. Accordingly, very few insights have been obtained and many questions are not addressed, yet. Particularly, so far very little is known about the potential impact of expression modalities on subjective measures of choice quality. More precisely, Klesse/Levav/Goukens (2015) show that expression modalities influence the likelihood of making indulgent choices and also influence the likelihood of making choices that are in line with affective preferences. However, the consequences of different expression modalities on subjective perceptions, such as the perceived satisfaction with an expressed choice, remain unobserved. This is particularly interesting as research implies that subjective perceptions related to choice, such as satisfaction, are not necessarily mirrored by the objective quality or rightness of an expressed choice (Iyengar/Wells/Schwartz 2006; Schwartz et al. 2002). Accordingly, the *second goal of the present dissertation* is to investigate the influence of choice expression modalities on choice related subjective perceptions.

Based on these research goals, the present dissertation is subdivided into five chapters and is structured as followed: In *Chapter 1* the general relevance of the investigation of choice expression modalities for research in consumer behavior is established (section 1.1) and the research goals of this dissertation are presented (section 1.2).

The subsequent *Chapter 2* is intended to provide the conceptual basis on which the present dissertation is grounded. To this end the relevant terms 'choice expression modality', 'choice rationality' and 'choice satisfaction' are introduced and explained (section 2.1). Hereafter, the dual processing theory as general theoretic foundation is introduced and elaborated (section 2.2). Section 2.3 and section 2.4 consecutively give a brief literature overview regarding

important insights into choice expression modalities and dual processing in the context of choice rationality (section 2.4.1) and choice satisfaction (section 2.4.2). Finally, section 2.5 is intended to summarize the insights from the literature and to develop the main research questions of the present dissertation.

Chapter 3 and *Chapter 4* represent the core of the present dissertation. *Chapter 3* is organized as scientific working paper and constitutes an empirical study (Study 1) intended to address the first research goal. As such *Chapter 3* investigates the effect of manual and oral choice expression modalities on the *induction of different types of mental processing*, which could explain the underlying mechanism for why different choice expression modalities affect choices in different ways. This first study (Study 1) comprises three experiments, which all feature an individual method, results and discussion part. After a brief introduction (section 3.1) and description of the conceptual foundation (section 3.2) a testable hypothesis stating that *manual choice expression is more likely to yield an objectively rational choice compared to oral choice expression* is developed (section 3.3). Thereafter, a general overview and explanation of the applied methods in the present experiments is provided (section 3.4). The following three sections comprise the three empirical experiments. Experiment 1 and Experiment 2 (a, b) in section 3.5 and 3.6 respectively, are intended to reveal whether manually expressed choices are more likely to yield an objectively rational choice compared to orally expressed choices. Besides providing additional robustness of the initial findings, Experiment 3 in section 3.7 is intended to feature an important boundary condition. More precisely, it is investigated whether orally expressed choices are still less likely to yield an objectively rational choice if cognition is externally triggered. Subsequently, *Chapter 3* closes with a general discussion of the obtained findings (section 3.8) including an argumentation about theoretical and practical implications.

While Study 1 in *Chapter 3* addresses the potential underlying mechanism for why different choice expression modalities might affect choice differently (i.e., induction of different types of mental processing), the second study (Study 2) in *Chapter 4* is intended to investigate the impact of oral and manual expression modalities on the subjective measure *choice satisfaction*. As such *Chapter 4* focuses on the second research question and hence, whether choice expression modalities also affect subjective perceptions related to choice. For this purpose, Study 2 comprises four empirical experiments, which all feature an individual method, results

and discussion part. More specifically, after a brief introduction (section 4.1) and presentation of relevant concepts (section 4.2), three hypotheses are developed (section 4.3). Particularly, it is proposed that *oral choice expression yields higher levels of choice satisfaction than does manual choice expression* (H1), that *this effect disappears once cognition is externally triggered* (H2) and eventually that *this effect is mediated by the level of intuition when cognition is not externally triggered* (H3). After a general description of the experimental procedure (section 4.4), the subsequent sections feature the four experiments. While Experiment 1 (a, b) (section 4.5) and Experiment 2 (section 4.6) are intended to address the main effect (H1), Experiment 3 (section 4.7) and Experiment 4 (section 4.8) are intended to replicate the main effect and additionally to address an important boundary condition (H2). Eventually, Experiment 4 (section 4.8) supports the assumption that the main effect of oral choice expression on choice satisfaction is mediated by the level of intuition when cognition is not externally triggered (H3). In a subsequent general discussion part (section 4.9), the obtained results are summarized and practical as well as theoretical implications are provided. In addition, section 4.9 addresses a major concern about the practical generalizability of the obtained results by the conduction of the post-hoc Experiment 5.

The final *Chapter 5* summarizes and discusses the insights and implications from Study 1 (*Chapter 3*) and Study 2 (*Chapter 4*) with reference to the research questions of this dissertation.

Figure 1 provides a visual representation of the general structure of the present dissertation.

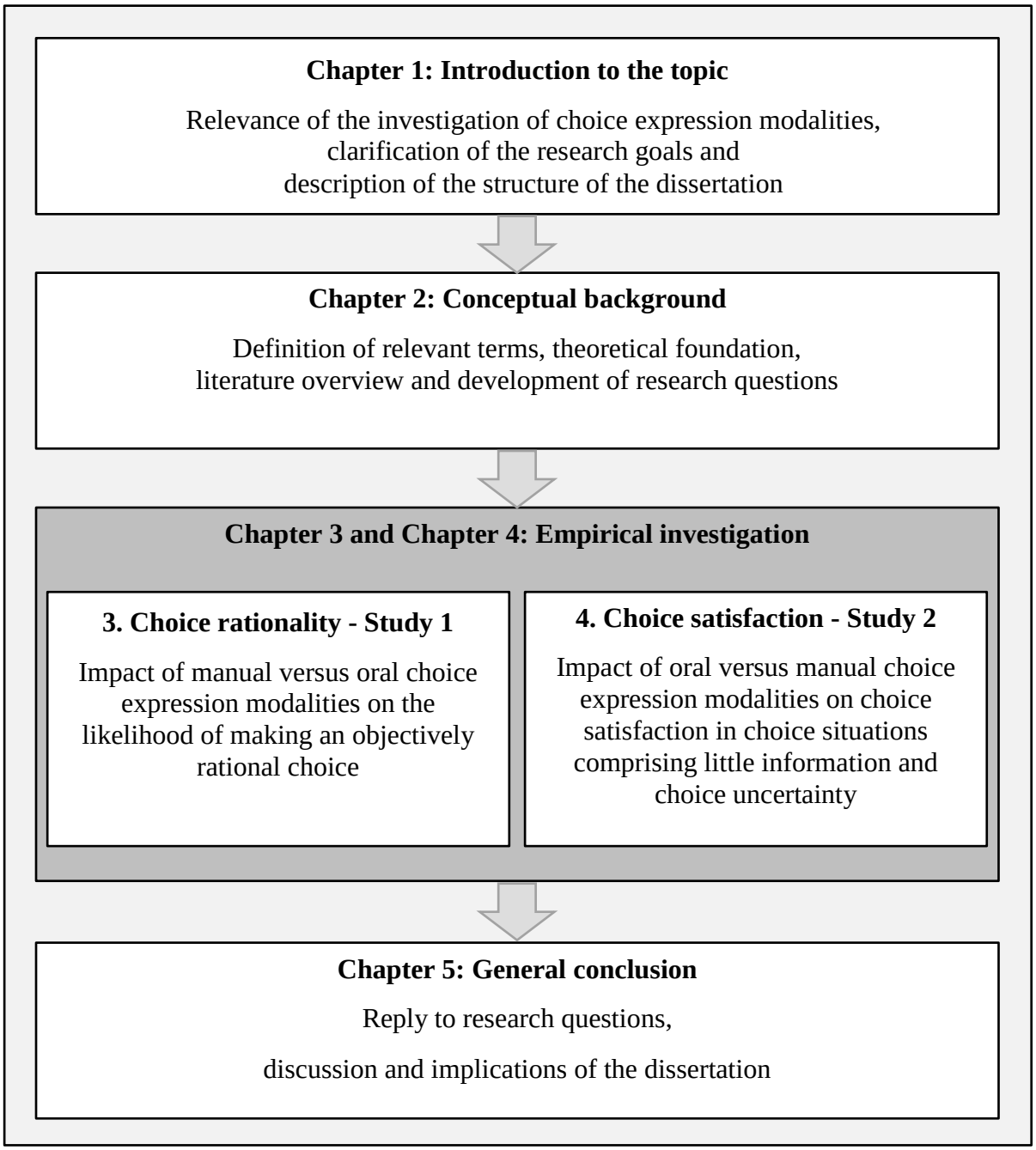

Figure 1: Structure of the dissertation

2 Conceptual Background

The second chapter of this dissertation is intended to define important terms and to provide a detailed overview of concepts and theories, which are relevant for the present dissertation. To this end, section 2.1 defines the terms choice expression modality, choice rationality, and choice satisfaction. Section 2.2 introduces the dual processing theory as theoretical foundation. The sections 2.3 and 2.4 provide a literature review regarding choice expression modality and dual processing in the context of rational choice and choice satisfaction. Finally, in section 2.5 the research questions for the present dissertation are developed.

2.1 Definition and Explanation of Important Terms

2.1.1 Discussion and Definition of the Term Choice Expression Modality

This paragraph is intended to develop a comprehensive definition to describe the phenomenon of different ways or modes to express decisions and choices. As indicated in the introduction of this dissertation (Chapter 1.1), the only study attempting to define different ways of expressing a preference was recently conducted by Klesse/Levav/Goukens (2015). There the authors define different ways to express one's choice as 'preference expression modality'. However, because preferences and choices do not necessarily need to be congruent (Markus/Schwartz 2010) the term preference expression modality might be improper to define different ways of choice expression. More specifically, as the term *preference* might be defined as value assessment that involves a tradeoff of liking different options (Amir/Levav 2008, Hausman 2011), *the expression of choice* (i.e., choosing) merely constitutes an observable, problem solving behavior (e.g., Amir/Levav 2008; Schall 2005; Simon 1957).

Despite the fact that *preference* and *choice* represent different constructs, normative choice theory assumes that preferences are perfectly reflected by choice behavior (Bettman/Luce/Payne 1998). That is, economic theory proposes that individuals have preexisting preferences for attributes of a choice set (e.g., preference for free time and preference for money), from which specific preferences for different choice options (i.e., a bundle of attributes: spending free time to earn more money and vice versa) are revealed during the decision and choice process (e.g., Fischhoff 1991, Kron/Milovanovic 1975; Slovic

1975, 1995). Eventually, individuals are ought to choose an option that dominates the remaining options within the given choice set (e.g., Restle 1961; Slovic 1975). According to this ‘preference construction view’, the investigation of choice would be sufficient to make inferences about the underlying preferences as the expression of choice would always reflect the expression of preferences.

However, empirical research implies that choices do not always perfectly mirror preferences. As the construction of preference requires some deliberation effort, individuals tend to avoid preference construction involving difficult and subjective value estimation. This is especially the case for rather unimportant choices, such as ordinary and habitual grocery shopping (e.g., Chaiken/Maheswaran 1994). In addition to that, individuals often express choices without being consciously aware of their own preferences (Amir/Levav 2008; Christenfeld 1995; Eliaz/Ok 2006).

Further, although there are situations in which preferences do influence choices (Sharot/De Martino/Dolan 2009), there is also evidence that in certain situations choices influence preferences. Dissonance theory constitutes a prominent example for this change of causality (Sharot/Velasquez/Dolan 2010). In this context, studies have repeatedly demonstrated that the subjective preference for a chosen option is significantly augmented and the preference for the non-chosen options is significantly attenuated once a choice is expressed (e.g., Brehm 1956; Egan/Santos/ Bloom 2007; Festinger 1957; Gu/Botti/Faro 2013).

Additionally, although the constructs ‘choice’ and ‘preference’ are both likely to deliver valuable insights and are worth to be studied, the investigation of choice seems to offer the opportunity for more rigorous research as it can be assessed very accurately (Border 1992; Samuelson 1938). In contrast, the assessment of preferences is rather difficult and involves a fair amount of uncertainty (Eliaz/Ok 2006). Following this argumentation, it appears that the term ‘choice expression modality’ might be more comprehensive than the term ‘preference expression modality’.

As addendum, it is noteworthy to mention that in every day’s language the verbs ‘to decide’ and ‘to choose’ as well as the related nouns ‘decision’ and ‘choice’ are often used and perceived as being synonyms (e.g., Evans 1955; Schall 2005). Despite their similarities, there is a minor, but important difference between these terms. While ‘to choose’ is defined as an

action to express a selection based on preferences, 'to decide' is generally defined as determination of a question (Nowell-Smith 1958). However, because in a choice situation the question of determination is defined as the consideration of which option to choose, it is possible to argue that decision is a precursor of choice and that 'to choose' is eventually simply the overt action corresponding to 'to decide' (Schall 2005). Therefore, a strict differentiation between these terms might not be selective. However, because in contrast to a decision only the actual choice is objectively observable, in this dissertation the terminology '*choice expression modality*' is utilized to define different ways and options of expressing a decision for or a choice of a certain option.

2.1.2 Rationality of Choice: A Matter of Objective or Subjective Outcome

Research implies that decision and choice situations can be classified into two general categories according to the outcome of choice (Giblin/Morewedge/Norton 2013; Inbar/Cone/Gilovich 2010; Morewedge/Giblin/Norton 2014). On the one hand, there are decision situations and choice problems in which the outcome of a given decision or choice can be objectively assessed. Put differently, in these situations individuals are given sufficient information about the choice options and can sequentially deduce the best or optimal option after comparing and weighting the characteristics of a given choice set (Payne/Bettman/Johnson 1988). For example, the government's decision where to locate a toxic waste dump or a student's decision which college to choose, constitute decision or choice situations that are objectively assessable (Inbar/Cone/Gilovich 2010). On the other hand, there are decision situations and choice problems in which the outcome of a given decision or choice is entirely subjective. Put differently, these situations do not feature a generally 'wrong' or 'right' or a 'good' or 'bad' option as the decision or choice outcome is idiosyncratic. For instance, whether one chooses pudding or ice cream for dessert is a result of personal or even situational preferences and it is futile to declare a general superiority of one of the options.

It is important to note that only the availability of sufficient information, but not the importance of a decision itself determines whether the outcome of a certain choice is a subjective or an objective matter. This can be exemplified by considering a person in a restaurant. If she can only choose between two deserts and knows that only one of them

contains peanuts, to which she is allergic to, the decision to choose the dessert without peanuts can be interpreted as being objectively rational, although generally the choice of a dessert is rather unimportant. However, the decision with whom one wants to spend one's life together with is highly subjective and idiosyncratic, although this decision is very important and momentous.

In addition to that, if in a specific decision or choice situation no or only insufficient information about the choice options is available, decisions and choices have to be expressed randomly, and accordingly the outcome of a choice in such a situation is subjective regardless of the actual importance of the decision (Christenfeld 1995; Payne/Bettman/Johnson 1988). Consider for instance a toss of a fair coin (i.e., a binary choice). Even if an individual might win a large amount of money by correctly predicting the outcome of the toss, the mere information that both sides show with equal probability is insufficient to determine an optimal choice. Thus, the prediction of the toss can only be made randomly. Accordingly, it is reasonable to argue that the outcome of a choice in choice situations featuring insufficient or little information can be defined as a subjective matter as it is not intelligible to define a superior choice.

In summary, one can differentiate between choice situations in which the outcome of a certain decision or choice is an objective matter or a subjective matter. If a given choice set features an option that can be objectively determined as 'the correct choice', 'superior to the remaining options' or simply as ' the best choice', the outcome of the underlying decision or choice is defined as objective matter and the superior option is defined as 'objective rational choice' (ORC). Only if an ORC exists, it is actually possible to express a rational choice. However, if a choice set does not include an ORC or if it features only insufficient information to determine the ORC, the outcome of the underlying decision or choice is defined as 'subjective matter', and rational choice making is by definition impossible in this situation (Giblin/Morewedge/Norton 2013; Inbar/Cone/Gilovich 2010, Morewedge/Giblin/Norton 2014).

2.1.3 Definition of Choice Satisfaction

In a world of fierce market competition, enterprises have to find and adjust opportunities to maintain and to enhance their market performance (Netemeyer/Maxham/Lichtenstein 2010).

In this context various studies have repeatedly shown that customer satisfaction may constitute a key determinant to build and to shape important beneficial factors, such as customer loyalty (Yi/La 2004), repurchase behavior (Olsen 2002), and customers' willingness to pay (Homburg/Koschate/Hoyer 2005). Eventually, because all of these factors tend to enhance profitability and the cash flow of the company (Luo/Homburg/Wieseke 2010), customer satisfaction can be considered an important corporate goal (Cooil et al. 2007; Fecikova 2004).

In this context, customer satisfaction can be considered as multidimensional construct (e.g., Athanassopoulos 2000; Czepiel/Rosenberg 1977) of which choice satisfaction constitutes an important aspect of overall customer satisfaction (Anderson/Fornell/Lehmann 1994; Fitzsimmons 2000; Heitmann/Lehmann/Herrmann 2007). Choice satisfaction can be defined as the individual level of satisfaction with a given choice, without taking into account the consumption or usage of the chosen object (e.g., Fassnacht/Schmidt/Pannek 2015; Krishen/Hu 2014). In comparison to consumption satisfaction or overall satisfaction, the concept of choice satisfaction describes a more abstract and perception based level of satisfaction, which is mostly independent from pre-existing preferences and the actual product experience. The distinction between choice satisfaction, consumption satisfaction and overall satisfaction becomes more evident when considering a simple example of an individual participating in a tasting study. Suppose that this individual is offered three different options, is only allowed to try one of them, and has to indicate her level of satisfaction. The assessment of overall satisfaction includes the consideration of satisfaction with context specific aspects, such as the taste, the texture, and the consumption enjoyment. However, in addition overall satisfaction also comprises the assessment of satisfaction with context and consumption unspecific aspects, such as pre-existing preferences about the offered options. Overall satisfaction is eventually the mental average of the satisfaction with all relevant aspects (Gilbert/Veloutsou 2006). In contrast, the assessment of consumption satisfaction excludes consumption unspecific aspects. Consumption satisfaction can therefore be defined as the assessment of pre-consumption standards and actual consumption experience (Heitmann/Lehmann/Herrmann 2007; Oliver 1989). Eventually, choice satisfaction would be the individual's satisfaction for choosing one particular option and not another one before trying any option. In other words, choice satisfaction defines the perception that an expressed choice was good and felt satisfying.

Because choice satisfaction is thus less affected by external influences (i.e., pre-existing preferences or pre-consumption standards), one can conjecture that choice satisfaction constitutes a more rigorous and less biased measure compared to the assessment of consumption or overall satisfaction. As the usage of very rigorous measures is particularly essential for the investigation of new research avenues, the focus of this dissertation is set on choice satisfaction (Calder/Phillips/Tybout 1982; Klesse/Levav/Goukens 2015; Peter 1981; Swets 1988).

2.2 Theoretical Foundation

2.2.1 Intuitive and Reflective Choices: The Dual Processing Theory

The idea that decisions and eventually choices are elicited on the basis of two distinct mental processes, one that is intuitive and one that is more analytic has a long tradition in social psychology and marketing research (Alter et al. 2007; Inbar/Cone/Gilovich. 2010). Already at the end of the nineteenth century, James (1890, 1950) differentiated between an experience-based associative type of thinking and a reason-based analytic type of thinking. Since then a tremendous body of research has evolved whereby the terms utilized to define the theory, the underlying models and even the general concepts have been repeatedly revisited and adjusted (e.g., 'heuristic and systematic information processing' by Chaiken 1980; 'system one and system two processing' by Stanovich/West 2000; 'associative and rule-based processing mode' by Smith/DeCoster 2000; 'reflection and reflexion' by Liebermann et al. 2002; 'reflective-impulsive model' by Strack/Deutsch 2004). Additionally, evidence from the field of neuroscience further supports the existence of the duality of mental processing (e.g., Qiu et al. 2007).

However, the fact that still many different concepts, models, and definitions of dual processing theory co-exist and that researchers in this field do not reach consensus on important aspects has caused a discussion about whether the dual processing theory might be generally questioned (Keren 2013; Keren/Schul 2009; Kruglanski/Gigerenzer 2011). Although this discussion is to some extent still in progress, it has already prompted many authors to review the overall concepts and to attempt to establish a more general and comprehensive theory (e.g., Evans/Stanovich 2013a; Evans/Stanovich 2013b;

Reyna/Brainered 2011). For instance, Evans/Stanovich (2013a) revisited the terms that diverse studies have assigned to the different styles of processing and concluded that defining rapid and intuitive processing as 'Type 1' and higher order reflective reasoning as 'Type 2 processing' constitute the most indisputable terms. They argue that unlike the often applied term 'System' (e.g., Kahneman 2003), the term 'Type' correctly implies that two forms of processing exist, but that these types might be based on more than two cognitive systems. Further, there is now much consensus on what Evans (2007) calls 'default-interventionist theory'. This theory assumes that individuals process information or sensations and response to them intuitively by default (i.e., Type 1) and that subsequent reflective processing (i.e., Type 2) only intervenes in case something unexpected happens or if individuals are highly motivated and committed (see also Strack/Deutsch 2004). In other words, individuals are assumed to process and response according to Type 1 processing until Type 2 processing is triggered by internal or external cues or antecedents (Evans/Stanovich 2013b).

2.2.2 Antecedents of Type 2 Processing

Despite the large number of scientific essays and empirical insights into the field of dual processing theory, research investigating which factors might potentially trigger individuals to engage in Type 2 processing and express choices and decisions accordingly is still limited (Alter et al. 2007; Evans 2008; Inbar/Cone/Gilovich 2010). The following section is intended to give a comprehensive overview of existing theories and discriminates between *internal* and *external* antecedents that trigger or induce Type 2 processing. Internal antecedents subsume all factors that are germane to subjective characteristics of an individual. Particularly, this includes the personal ability and motivation to engage in Type 2 processing (De Mello/MacInnis/Stewart 2007). On the contrary, external antecedents subsume all contextual factors that foster reflective thinking and Type 2 processing independent from internal antecedents.

2.2.2.1 *Internal Antecedents*

The idea that internal factors induce reflective thinking and that the engagement in Type 2 processing is highly dependent on personal variables is commonly accepted. An early example of this concept is embedded in 'the contingency model' developed by

Beach/Mitchell (1978). The basic assumption of this model is that decisions and eventually choices can be made according to three general decision strategies, which are called ‘aided analytic’, ‘unaided analytic’ and ‘nonanalytic’ strategies. The first two strategies comprise rational decision processes (e.g., Type 2 processing) and only differ to the extent of expressing the underlying decision rules explicitly (i.e., aided analytic) or just mentally (i.e., unaided analytic). In contrast, a nonanalytic strategy is merely an intuitive rule of thumb (e.g., Type 1 processing). Because these decision strategies require different amounts of cognitive effort, Beach/Mitchell (1978) argue that the decision maker first mentally assesses the importance of the decision at hand and then decides for an appropriate decision strategy accordingly. More specifically, the authors assume that if a decision is perceived as being important, it is more likely that decision makers apply an analytic strategy, while if the decision is unimportant or its consequences are negligible, decision makers are more likely to apply a ‘rule of thumb like’ nonanalytic strategy. This supposition is also in line with what Payne/Bettman/Johnson (1993) call ‘the adaptive decision maker framework’. Payne and his colleagues (1993) argue very similarly to the assumptions of ‘the contingency model’ that a decision maker assesses the characteristics of the choice context (e.g., importance of the choice or required effort to align the presented information) before adjusting the decision strategy and decision precision correspondingly. Hence, both theories implicitly assume that Type 2 processing is to a large extent internally triggered, as the decision maker willingly opts to apply a certain decision strategy after assessing the subjective importance of a decision.

In the same vein of thoughts, Chaiken (1980) shows that the likelihood of reflective processing is increased by the importance and the personal relevance of particular information. Although the original ‘heuristic-systematic model’ by Chaiken (1980) focuses on how individuals process information rather than on how they make decisions or choices, the model’s results can also be transferred to decision or choice situations (e.g. Suri/Monroe 2003). The research of Chaiken (1980) implies that the perception of personal relevance and importance of a message augments the likelihood that individuals process and respond to it in a systematic manner compared to when the message is perceived as being irrelevant and unimportant (see also Chaiken/Maheswaran 1994). The idea that motivation and personal relevance is an essential internal antecedent of Type 2 processing is also the foundation of the ‘elaboration likelihood model’ by Petty/Cacioppo (1986). Here the authors argue very similar to the ‘heuristic-systematic model’ (Chaiken 1980) that individuals only process information

in-depth if their motivation to do so is high. Additionally, Petty/Cacioppo (1986) assume that the idiosyncratic ability to process information systematically is another key antecedent of Type 2 processing. In other words, if individuals do not possess the cognitive ability or if the situation suppresses the ability of systematic information elaboration (e.g., time pressure), motivation is not sufficient for Type 2 processing to occur. In summary, the authors conclude that if individuals possess the ability to process information or a decision scenario systematically and if the information or the decision itself is personally relevant, individuals are likely to engage in Type 2 processing. This argumentation implies that Type 2 processing can also be externally triggered, for instance by increasing the personal relevance of a decision or choice.

2.2.2.2 *External Antecedents*

The 'cognitive continuum theory' by Hammond et al. (1987) is one of the first theories that explicitly states that the decision context can induce Type 2 processing and that this induction is at least to some extent independent from individual relevance of the decision context and ability to engage in Type 2 processing. Additionally, this theory postulates that characteristics of the decision context might trigger a certain response mode. For instance, in situations in which the application of an analytic decision approach is difficult or even impossible, individuals are likely to rely on intuition to make a choice. However, if the decision context provides clear and objective information, individuals seem to be more likely to engage in Type 2 processing. Although the cognitive continuum theory is one of the first attempts to describe the contextual and thus external cues potentially induce Type 2 processing and is thus very interesting, the theory does not explicitly explain why and how the decision context triggers Type 2 processing (see Inbar/Cone/Gilovich 2010 for a critical discussion on the cognitive continuum theory).

The work by Inbar/Cone/Gilovich (2010) was intended to close this theoretical gap and to explain the antecedents of context induced Type 2 processing by defining 'the task cueing hypothesis'. That is, in their studies the authors observe that if a certain task involves characteristics representative for Type 2 processing, individuals are eventually more likely to use Type 2 processing to solve this task. For instance, the authors show that increasing the complexity of a choice set augments the likelihood that choices are elicited based on Type 2

processing. Noteworthy is the fact that this finding remains significant even after controlling for perceived importance of the choice at hand. In other words, the external factor ‘complexity’ triggers Type 2 processing independent from the internal factor ‘perceived importance of an item’. Very similar to ‘the task cueing hypothesis’, Alter et al. (2007) investigate the direct impact of external cues on Type 2 processing and find that task difficulty and perceived disfluency can trigger Type 2 processing independent from any other internal or external factor.

In summary, the likelihood that individuals engage in Type 2 processing or remain default Type 1 processing when making a decision and expressing a choice is influenced by internal and external factors. Because the modality in which a choice is expressed does not constitute an internal but rather an external antecedent, the focus of the present dissertation is to shed light on choice expression modalities as potential external antecedents of Type 2 processing.

2.3 Literature Overview on Choice Expression Modalities

As the investigation of the impact of different choice expression modalities constitutes a very new field of research, so far only very few insights are obtained. Consequently, a thorough review of existing literature is only conditionally possible. The structure of chapter 2.3 is therefore diverging from the traditional standards of a literature review as the aim of this chapter is two folded. First, by reviewing literature implicitly investigating the impact of channels and choice situations on decision making and choice, the initial assumption by Klesse/Levav/Goukens (2015) that the majority of choices are either expressed orally or manually shall be revised. To this end, three very common choice situations are introduced (i.e., choice in stores, choice in the internet, and choice at vending machines) and a discussion about choice modalities, specific to the choice situation is provided. Second, by reviewing findings in the field of neuroscience, it is indented to build a theoretical foundation for the so far implicit assumption that manual choice expression is more likely to yield reflective choices (i.e., based on Type 2 processing) and that oral choice expression is more likely to yield intuitive choices (i.e., based on Type 1 processing).

2.3.1 Choice Expression Modalities in Different Choice Situations

2.3.1.1 *Choice Expression in Stores*

Despite the existence of various different opportunities and situations to express choice, the majority of consumer choices are still expressed in the channel of traditional brick and mortar stores (e.g., Avery et al. 2012; Cox/Cox/Anderson 2005; Pauwels/Neslin 2015; Thomas/Sullivan 2005; U.S. Census Bureau 2015). Although the generic term ‘bring and mortar store’ comprises an almost infinite number of different retailing or service providing facilities, it is reasonable to generally categorize bring and mortar stores according to whether the involved choice expression includes the necessity to interact with other individuals or not.

Stores including the necessity to interact with other individuals encompass pharmacies, restaurants, banks, butchers, traditional bakeries, corner-shops, and premium stores (e.g., wine house, jeweler). Although this list is to no end exhaustive and might be extended by other examples, the similarity among these stores should become evident: In all choice situations the customer has to express her choice orally by speaking to a service-assistant, clerk, or waiter.

Even though most stores offer at least the additional opportunity to interact with the selling staff (e.g., asking an employee), it is reasonable to assume that customers will only interact with the selling staff if it is actually necessary (Cox/Cos/Anderson 2005; Falk/Campbell 1997). More precisely, in supermarkets, clothes outlets and any other stores offering self-service (e.g., a buffet in a restaurant) customers normally express their choice by merely taking the item they want without engaging in any form of interaction, such as verbal communication with other individuals.

Following this argumentation that most daily choices are still expressed in brick and mortar stores and the differentiation between stores that do or do not include the necessity to interact with another individual to express one’s choice, it is reasonable to argue that most daily choices in stores are asserted by either oral or manual choice expression modalities.

2.3.1.2 *Choice Expression Online*

Despite the diverse insights into online choice behavior and about the differences and similarities between online and offline shopping behavior (e.g., Chu et al. 2010; Chu/Chintagunata/Cebollada 2008), so far no scientific effort has been made to investigate the modality through which choices are expressed online. More precisely, there are no insights into whether the choice expression modality enabled by the internet has any indirect or direct effect on choice.

Obviously, online choices are expressed by 'clicking' and it is reasonable to argue that the online choice situation of choosing an item by clicking and dropping it into a virtual shopping basket is comparable with the choice situation in an offline store that does not include the necessity to interact with another individual (e.g., Pitta/Franzak/Fowler 2006). In both situations choices are expressed by a manual action (e.g., clicking on an item or taking an item) and as online shopping constitutes a private experience (e.g., Kukar-Kinney/Grewal 2007), both situations do not include the necessity to verbally interact with another person. Accordingly, it can be conjectured that although there are important differences between online and offline choice situations, the modality of choice expression is comparable. Therefore, it is argued that online choice expression constitutes another form of manual choice expression.

2.3.1.3 *Choice Expression at Vending Machines*

Another very common situation of choice expression involves the usage of vending machines. Although vending machines usually contain snacks or beverages and thus mainly serve consumer products (Anupindi/Dada/Gupta 1998; Desai/Hoyer 2000), there is virtually no product category that cannot be chosen through a vending machine (Cross 2002; Dahl/Manchanda/Argo 2001). Despite the fact that choice expression at vending machines constitutes a rather common choice situation (French et al. 2001), little is known about the potential impact of the vending machine specific choice expression modality on choice. In order to express a choice at a vending machine an individual has to push buttons or has to turn slots (Brehm/Cole 1966). Thus, because choices are expressed by a manual action that does not require any form of verbal interpersonal interaction (Rayport/Jaworski, 2004), it is

reasonable to argue that the choice expression at vending machines is yet another form of the modality of manual choice expression.

In summary, chapter 2.3.1 indicates that most daily consumer choices are either expressed orally by talking to another person or manually by any form of physical action (e.g., by taking an item or by clicking or pushing). Although, it is reasonable to argue that brick and mortar stores, the internet, and vending machines capture the majority of daily choice situations, this list of potential choice situations is to no end exhaustive. However, despite the maybe infinite number of different choice situations, it is claimed that it is generally intelligible to conjecture that probably all choice situations involve either a form of personal and verbal interaction, or a form of physical action to express choice. Following this argumentation, it is reasonable and comprehensive to differentiate between choice situations featuring oral choice expression modalities and choice situations featuring manual choice expression modalities.

The following chapter 2.3.2 is intended to provide an argumentation for the assumption that orally and manually expressed choices might yield different choices, due to different mental processing types (e.g., Bock 1996; Klesse/Levav/Goukens 2015).

2.3.2 The Impact of Choice Expression Modalities on Brain Activity and Type 2 Processing

Although research on functional brain connectivity is to no extend conclusive and unequivocal (e.g., Damoiseaux/Greicius 2009; Ramsey et al. 2010; Sharma/Baron/Rowe 2009), various studies repeatedly imply that the level of brain activity and the location of the activity within the brain is likely to be different for the execution of intended motoric action (e.g., manual response) compared to the execution of oral verbalization (e.g., speaking) (Frith et al. 1991; Wilson et al. 2004). Particularly, it seems likely that the specific areas triggered by simple manual actions are involved in higher cognitive processing. For instance, Kuo et al. (2009) find in an functional magnetic resonance imaging (fMRI) study that individuals solving tasks that require cognitive deliberation effort (e.g., dominance games) show increased activity close to the motor cortex (i.e., in the frontal lobe) and in the precuneus, a brain area responsible for motor control and motor coordination (Cavanna/Trimble 2006; Luo/Ding/Luo 2004). Further, Paus et al. (1993) found in a positron emission tomography (PET) study that manual actions (e.g., key-pressing of the right hand) trigger activity in the dorsal/caudal part of the anterior cingulate cortex (ACC), which is considered to be strongly

involved in higher cognition and in the execution of demanding cognitive tasks and inferential reasoning (Bush/Luu/Posner 2000; Qiu et al. 2007).

Accordingly, because motoric actions (e.g., manual choice expression modality) seem to trigger activity in brain areas likely related to higher cognition, it is conjectured that expressing a choice manually will likely trigger Type 2 processing.

Although speech production also involves motoric actions (e.g., facial muscles and tongue movement), it seems likely that particularly the left insula is responsible for the motor control of speech (Ackermann/Riecker 2004; Dronkers 1996). This is particularly important to note as Bush/Luu/Posner (2000) find that the insula is active for automatic actions and Kuo et al. (2009) observe that the insula shows increased activity for intuitive tasks (e.g., coordination game). In addition, Paus et al. (1993) show that the verbal utterance of a pronoun causes activation in the rostral/ventral part of the ACC, which is often considered as the affective division of the ACC (Bush/Luu/Posner 2000). Therefore, it is assumed that in contrast to manual choice expression, oral choice expression does not trigger Type 2 processing. A graphical summary of the argumentation in this section 2.3.2 is given in Figure 2.

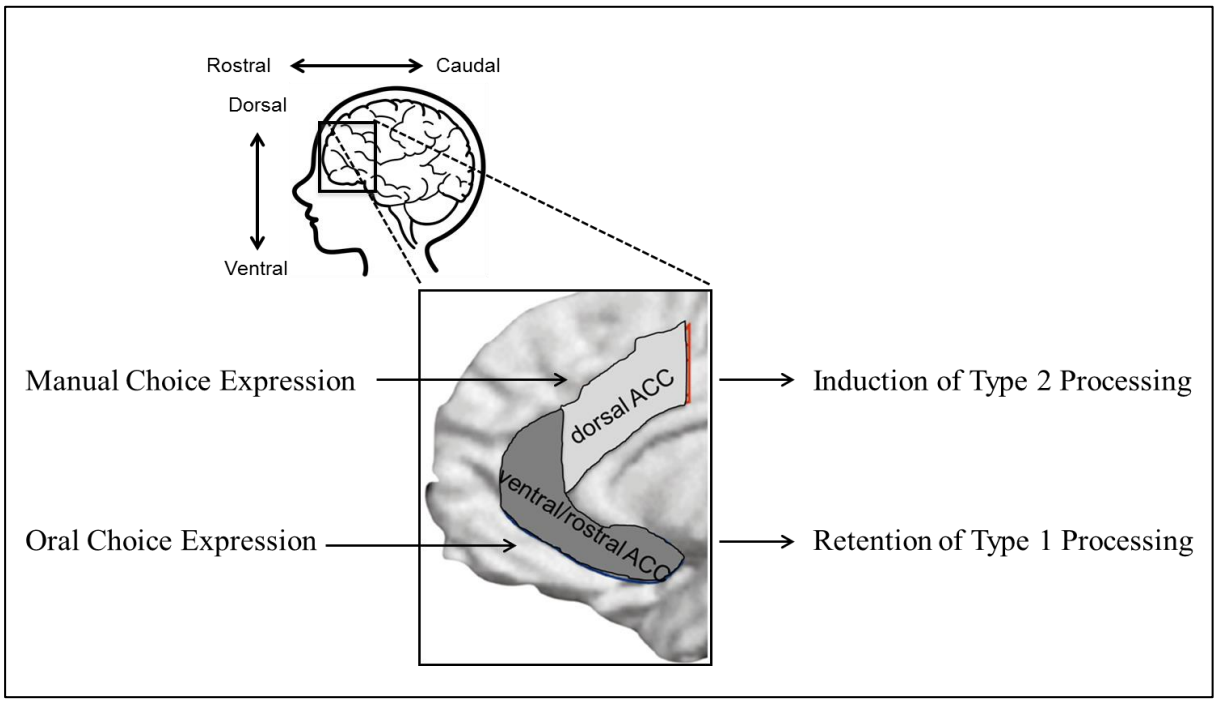

Figure 2: Conjectured relation of choice expression modalities and processing Types within the ACC

Source: Figure 2 is based on the work of Bush/Luu/Posner (2000)

2.4 Literature Overview on Dual Processing in the Context of Decision Making

The following section is intended to provide a comprehensive literature overview on findings regarding the impact of reflective (i.e., Type 2 processing) or intuitive (i.e., Type 1 processing) in the context of choice rationality and choice satisfaction.

2.4.1 Rational Choices and Dual Processing Theory

Research has repeatedly shown that if a decision or choice situation features determinable 'good' or 'bad' options and thus holds the opportunity to make an ORC, Type 2 processing augments the probability of making an optimal final choice (Alter et al. 2007; Chaiken 1980; Hamilton/Hong/Chernev 2007; Stanovich/West 2000). This finding is in line with traditional economic theories, implying that decisions involving deliberation and rational thought always yield superior outcomes compared to decisions based on intuitive gut feeling (Denno 2003; Simon 1955; Von Neumann/Morgenstern 2007). To investigate the likelihood of individuals expressing an ORC as proxy for Type 2 processing, various methods and procedures have been established. Based on the comprehensive work of Toplak/West/Stanovich (2011), Table 1 summarizes the most frequently applied methods to assess the likelihood of individuals making an ORC or rational decision over an intuitively appealing, but irrational choice or decision option. Table 1 is ordered alphabetically and comprises the most frequently applied methods accompanied by a brief description of the underlying reasoning.

Method	Example/Definition	Relevant sources
Bayesian reasoning	Assessment of the probability of an event, given a conditional probability.	Beyth-Marom/Fischhoff 1983; Stanovich/West 1998b
Causal base rate	Choosing the option recommended by Consumer Reports over the option recommended by a friend is the ORC.	Fong/Krantz/Nisbett 1986
Cognitive reflection test	Choosing a correct over an intuitively appealing option is an ORC.	Alter et al. 2007; Campitelli/Labollita 2010; Frederick 2005
Conjunction problem	Assessing that the conjunction of two independent events cannot be more likely than any of the single events constitutes an ORC.	Tversky/Kahneman 1983
Framing problem	A problem is once framed positively and then negatively. Not changing initial choice is a proxy for ORC.	Tversky/Kahneman 1981
Methodological reasoning	Assessing the ability to reason methodologically correctly is an ORC.	Lehman/Lempert/Nisbett 1988
Monty Hall's three doors game	Switching an initial choice after new information shape winning probabilities is an ORC.	Friedman 1998; Gilovich/Medvec/Chen 1995; Granberg/Brown 1995
Outcome bias	Evaluating events according to their relative odds, not absolute outcome.	Baron/Hershey 1988
Probabilistic matching/ Gamblers fallacy	Consistency of strategy in games of independent events is rational behavior.	West/Stanovich 2003; Gal/Baron 1996
Probabilistic reasoning/ Ratio bias/ Covariation detection	Choosing an option that appears relatively more frequently over an option that appears absolutely more frequently is an ORC.	Denes-Raj/Epstein 1994; Kirkpatrick/Epstein 1992
Sample size bias/ Regression to the mean	Intuitively every sample is likely to match the universal average, but a larger sample is more likely to represent the universal average.	Tversky/Kahneman 1974; Kahneman/Tversky 1982; Lehman/Lempert/Nisbett 1988
Sunk costs bias	Choice consistency independent from initial investments is ORC.	Frisch 1993; Stanovich/West 1998a
Syllogism	Assessing the valence of a conclusion based on two (or more) premises correctly is an ORC.	De Neyes 2006; Khemlani/Johnson-Laird 2012

Table 1: Overview of methods to assess ORC as proxy for Type 2 processing, alphabetic order

Source: Table 1 is based on the work of Toplak/West/Stanovich (2011). Note, this list is not conclusive as other methods might exist or are still to be developed.

Although the assertion that Type 2 processing always increases the probability of making an ORC is reasonable and intuitively appealing, other studies indicate that depending on the choice situation Type 2 processing does not necessarily augment choice quality (Epstein/Denes-Raj/Pacini 1995; Giblin/Morewedge/Norton 2013; Novak/Hoffman 2009). For instance, in their classic study, Wilson/Schooler (1991) observed that students made course choices more in line with experts' opinions when they decided intuitively compared to when they were ask to give reason for their choice or evaluate all attributes of the courses offered in depth. The rationale behind this argumentation is based on the assertion that especially important choices are accompanied by complex and an often tremendous amount of information. Although sufficient information is a necessary precursor to make an ORC, too much information is likely to impede the decision process and thus to decrease the likelihood of making an ORC (Dijksterhuis/van Olden 2006; Heitmann/Lehamnn/Hermann 2007; Nordgren/Dijksterhuis 2008; Wilson/Schooler 1991). Moreover, it is important to note that a decision based on reflective Type 2 processing does not increase the likelihood of making an optimal choice when the choice outcome is a subjective matter and thus the choice situation does not feature an ORC. For instance, whether an individual prefers one poster over another cannot be objectively evaluated as the final choice cannot be considered as being 'good' or 'bad' per se (Giblin/Morewedge/Norton 2013; Inbar/Cone/Gilovich 2010).

In summary, if a choice situation features sufficient information or comprises an ORC and if there is no or little choice uncertainty (i.e., choice outcome is an objective matter), decisions based on Type 2 processing augment the likelihood of making an optimal choice and are thus superior compared to choices based on Type 1 processing. However, if the choice situation features too much or too little information, and an ORC is not available (i.e., choice outcome is a subjective matter), decisions based on Type 2 processing do not necessarily yield superior choices.

2.4.2 Choice Satisfaction and Dual Processing Theory

Previous studies in the field of social psychology and marketing have repeatedly shown that external factors impact how satisfied individuals are with their choice. There is for instance empirical evidence that implies that factors, such as the size of an assortment (Iyengar/Lepper 2000), the fact as to whether presentation of options appears simultaneously or sequentially

(Mogilner/Shiv/Iyengar 2013), and even the underlying process of decision making (Zhang/Fitzsimons 1999) have a strong influence on choice satisfaction. There is however, little knowledge about whether the type of cognitive processing during decision making has an impact on the level of perceived satisfaction with an expressed choice.

Although intuitive decisions and 'impulsive buying' represent fairly common consumer behaviors (e.g., Rook/Fisher 1995; Steenkamp/Maydeu-Olivares 2015), lay-people and experts often consider intuitive decisions based on 'gut-feeling' as inferior compared to rational decisions (Shafir/Simonson/Tversky 1993; Simonson 1989; Strack/Werth/Deutsch 2006). More specific, it is commonly proclaimed that thorough deliberation about decisions augments the decision quality (e.g., Chaiken 1980), which should eventually increase satisfaction with an elicited choice (e.g., Raiffa 1968; Tordesillas/Chaiken 1999). This conjecture is mainly based on the traditional economic view, which implies that rational decisions are generally more acceptable and maintainable (Simon 1955) and the assumption that individuals are more satisfied with their decisions and choices if they can justify them to others (e.g., Heitmann/Lehmann/Herrmann 2007; Slovic 1975). This view implies that choice satisfaction would be strongly related to choice rationality, and choice satisfaction should be positively affected by a reflective decision style (i.e., Type 2 processing).

However, there is evidence which implies that intuitive decisions cannot be considered as being generally inferior and as less satisfying (Novak/Hoffman 2009). In contrary, depending on the context, intuitive decision making might even result in greater choice satisfaction compared to reason based decision making (Dijksterhuis et al. 2006; Kahneman 2003). Particularly, if a choice situation comprises little information and a high amount of choice uncertainty, individuals might benefit from a more intuitive decision style (e.g., Type 1 processing). Although an intuitive decision style cannot systematically increase the likelihood of making an ORC by definition (since making an ORC always involves the deliberation and weighting of different options), it might be that an intuitive decision style augments satisfaction. For example, Wilson et al. (1993) found that satisfaction with a self-chosen poster as compensation for participating in an experiment was lower among participants that were asked to give reason for their poster choice and thus made an objective decision compared to participants that were not asked to give any reason for their poster choice and thus made an intuitive decision. Further, the study of Dijksterhuis et al. (2006) even indicates

that particularly for complex decisions (e.g., buying a new car) choice satisfaction can be increased when choices are based on unconscious deliberation rather than on rational thought. Particularly interesting is the observation that for choices with a subjective outcome an ORC does not necessarily result in higher levels of satisfaction (Schwartz et al. 2002). For instance, Iyengar/Wells/Schwartz (2006) find that the individual assessment of satisfaction with one's career is independent from job status and objective job fit. In other words, even if individuals might have chosen their optimal career, they might not be satisfied with it. In contrast to that, although individuals might have chosen a career which does not have a high status and does not match their talents, they might still perceive their choice as comparably satisfying. Although the authors do not mention the career choice process of their participants, one could conjecture that because a career choice is highly subjective that those individuals who intuitively chose a career path were more satisfied with their jobs than those individuals who planned every part of their career in detail.

In summary, when objective decisions rules are not applicable due to context specific constraints (i.e., too complex, limited, or no information is available) or because the choice outcome is a subjective matter, intuitively expressed decisions might outperform deliberation based and reflectively expressed decisions. That is, based on the literature one can deduce that if a choice situation is defined by little information, choice uncertainty and the absence of an ORC (i.e., a subjective matter) choices expressed based on an intuitive decision style (i.e., Type 1 processing) are likely to yield higher levels of choice satisfaction compared to choices expressed based on a reflective decision style (i.e., Type 2 processing).

2.4.3 Final Thoughts about the Assessment of Dual Processing

In the previous section of this dissertation, different research ventures and studies investigating dual processing and its consequences for choice rationality and choice satisfaction were briefly introduced. However, it is noteworthy to mention that in all studies the occurrence of Type 2 processing was not directly assessed but rather implicitly deduced. That is, although the different authors were able to observe that participants acted and behaved in ideal and predicted manner according to theoretical assumptions about Type 2 processing, so far no study exists that explicitly and directly measures the occurrence of Type 2 processing. For instance, Alter et al. (2007) conjecture that disfluency should induce Type 2

processing and accordingly find that participants facing disfluent information performed better on tasks requiring attention and deliberation compared to participants who faced the exact same information, but in a fluent manner. Although the authors' argumentation is convincing and an alternative explanation is not obvious, they do not prove that disfluency triggers Type 2 processing, but that disfluency increases the performance in attention and deliberation demanding tasks. The assumption that performance in these tasks holds as a proxy for the occurrence of Type 2 processing is reasonable, but so far the concrete direction and causality of this relation is not explicitly proven in an empirical endeavor. In future studies, this explicit evidence might come from research in neuroscience, but then the settings and methods currently applied in this field, might create a fairly artificial situation which could potentially impact the results (see for instance Kuo et al. 2009).

However, because current findings in neuroscientific research generally support the assumptions of the dual processing theory by implying that reflective and intuitive solving strategies can be attributed to different levels of activity in different brain areas (Kuo et al. 2009; Qiu et al. 2007) and because currently a direct assessment of the mental processing styles seems to be difficult and virtually impossible in a realistic setting, the assessment of the probability of making an ORC in a specific choice situation appears to be the best proxy for the assessment of Type 2 processing (see Toplak/West/Stanovich 2011; West/Stanovich 2003). Accordingly, in this dissertation it is assumed that if individuals behave in line with predictions about Type 2 processing, it can be deduced that they engage in Type 2 processing.

2.5 Summary of Literature Overview and Development of Research Questions

As the investigation of choice expression modalities constitutes a new research avenue within the field of marketing, consumer behavior, and social psychology, very few insights exist so far. Although there are still many unanswered questions, the previous literature review (section 2.3) indicates that the differentiation between manual and oral choice expression modalities is a reasonable classification (e.g., Klesse/Levav/Goukens 2015). The present dissertation will therefore adapt this recommended classification of choice expression modalities.

With reference to findings in the field of neuroscience, there is implicit support for the assumption that different modalities of choice expression might yield different types of mental processing. More specifically, it appears that manual actions trigger activity in brain areas involved in higher cognition, while oral utterance does not trigger activity in these areas (Bush/Luu/Posner 2000; Paus et al. 1993). In other words, these findings indicate that manual choice expression triggers individuals to engage in Type 2 processing, while oral choice expression does not trigger Type 2 processing and consequently individuals retain Type 1 processing. However, so far no study has tried to empirically proof this conjecture. Consequently the following research question might be formulated:

In contrast to oral choice expression, does manual choice expression trigger Type 2 processing?

However, because the direct assessment of Type 2 processing in a realistic setting is virtually impossible, as outlined in section 2.4.3, in the present dissertation indirect methods to assess the likelihood of engaging in Type 2 processing are applied. Therefore, the assessment of the probability of making an ORC will be applied as proxy for Type 2 processing (Toplak/West/Stanovich 2011).

Accordingly, the literature overview in chapter 2.4 illustrated the insights into the relation between dual processing and choice rationality and making an ORC in particular. It was argued that neither a reflective nor an intuitive style of decision making and choice expression can be generally considered as being superior or inferior. Instead it seems that if the situation provides sufficient and relevant information to make an ORC, individuals benefit from a more

deliberative reflective style of decision making (i.e., Type 2 processing). Therefore, the initially stated first research question will be adjusted, so that a more unequivocal answer becomes feasible:

First research question: What is the impact of manual and oral choice expression modalities on the likelihood of making an ORC as proxy for Type 2 processing?

This research question is intended to be answered in Chapter 3 by Study 1.

Further, it appears that if a choice situation does not comprise an ORC, little (or too much) information is available and the choice outcome is subjective, a reflective decision style is unlikely to augment the objective quality of choice. On the contrary, there is evidence that in particularly these choice situations an intuitive decision style might increase the subjective perception of choice satisfaction. Accordingly, the second research question is stated:

Second research question: What is the impact of manual and oral choice expression modalities on subjective choice satisfaction in a choice situation with subjective outcome?

As Type 1 processing constitutes the default mode of mental processing by definition (Evans 2007), the implicit assessment of Type 1 processing appears to be difficult. However, a considerably high level of intuition in decision making might be a proxy to prove the existence of Type 1 processing (Alter et al. 2007). Accordingly, in line with the assumption that Type 1 processing has a positive impact on choice satisfaction, if the choice outcome is a subjective matter, the following research question is formulated:

Third research question: Is the impact of manual and oral choice expression modalities on choice satisfaction in a choice situation with subjective outcome mediated by the level of intuition in decision making?

The second and third research questions are intended to be answered in Chapter 4 of the present dissertation by Study 2.

3 Study 1: The Effect of Manual and Oral Choice Expression Modalities on Choice Rationality

The following *Chapter 3* is presented in form of a scientific working paper. In this chapter, the effect of manual (i.e., taking and button pressing) and oral (i.e., speaking) choice expression modalities on *choice rationality* is investigated. Based on the dual processing theory and research in neuroscience, it is conjectured that manual choice expression induces cognitive, Type 2 processing. Consequently, it is predicted that a manual modality of choice expression is more likely to yield an ORC than an oral modality of choice expression. In line with this conjecture, three laboratory experiments are conducted. Accordingly, the obtained results indicate that manually expressed choices are more likely to yield an ORC compared to orally expressed choices (Experiment 1, Experiment 2 (a, b)). However, if Type 2 processing is externally triggered prior to choice expression, no difference in the likelihood of making an ORC is observed (Experiment 3).

3.1 Introduction

'We define ourselves by the choices we have made. We are in fact the sum total of our choices' is part of the final quote of the fictive character Professor Louis Levy in the 1989 Woody Allen movie 'Crimes and Misdemeanors' (Allen 1989). Of course nobody would doubt that important life choices such as getting married or choosing a career have a huge impact on our future and define who we are. But even smaller and rather ordinary choices, such as picking an item from the lower and not from the upper part of a shelf, ordering a salad and not pasta at a restaurant, or buying one brand while refusing to buy another at a grocery store have an impact on our mood, behavior, and well-being (e.g., see Patall/Cooper/Robinson 2008 for an overview). In many situations we have various ways or modalities to express our choices (e.g., we can say what we want or simply take what we want) and the choices we make are often based on either intuition or on rational deliberation and differ to their extent of being objectively rational (De Neyes 2006; Evans 2011; Giblin/Morewegde/Norton 2013). Although the fact that different modalities for choice expression can be applied and the fact that the level of the objective rationality of an expressed choice might differ seem to be very

salient, no research has so far investigated whether a direct link between the modality of choice expression and the objective choice rationality exists.

This study is intended to close this research gap and to investigate whether the way in which a choice decision is expressed (i.e., choice expression modality) influences the objective rationality of a choice (i.e., choice rationality). In three laboratory experiments, it is revealed that in contrast to orally expressed choices, manually expressed choices are more likely to yield an ORC. Implications for theory and practice are provided and discussed. This study starts with a brief explanation of the conceptual context and a brief introduction of the underlying theories.

3.2 Conceptual Context

3.2.1 Choice Expression Modalities and Dual Processing Theory

Nowadays individuals are offered various different ways, options, and modalities to express their decisions and choices in the market. Although research repeatedly indicates that decisions and choices are highly dependent and strongly influenced by contextual factors (see Gu/Botti/Faro 2013 for an overview), and the fact that different choice expression modalities exist is indubitable, so far few is known about the potential impact of different choice expression modalities on decisions and choices. One exception constitutes the work of Klesse/Levav/Goukens (2015). The authors conjecture that the modality in which a choice or preference is expressed affects preference consistency. By observing choice situations that involve self-control dilemmas, the authors find that individuals who express preferences orally are more likely to choose an indulging over a healthy choice option than are individuals who express preferences manually. Klesse/Levav/Goukens (2015) explain this finding by speculating that the oral expression of choice might be more automatic and is therefore more consistent with genuine desires compared to manual expression of choice that involves more executive function and might therefore induce cognitive deliberation.

The assumption that decisions and choices can be either expressed intuitively or after some deliberation effort is in line with the dual processing theory (Evans/Stanovich 2013a; Evans/Stanovich 2013b; Reyna/Brainered 2011; Wason/Evans 1975). In a nutshell, the dual processing theory implies that individuals can process information, elicit decisions, and

express choices based on one of two distinct mental processes. They can either express an intuitive, 'gut-felling' Type 1 or a reflective, 'analytic' Type 2 decision or choice (Alter et al. 2007; Inbar/Cone/Gilovich 2010). Although the tendency of processing according to Type 1 or Type 2 is strongly affected by internal factors, such as personal ability and motivation to deliberate or to rely on intuition (Chaiken 1980; Chaiken/Maheswaran 1994; Petty/Cacioppo 1986), the 'default-interventionist theory' (see Evans 2007) implies that individuals process information and elicit decisions according to Type 1 processing by default. However, if Type 2 processing is induced by external triggers that interrupt and impede the fluency of processing or induce cognition, individuals process information thoroughly and elicit decisions and choices according to Type 2 (Evans/Stanovich 2013b). By connecting the speculation of Klesse/Levav/Goukens (2015) that manually expressed choices are elicited less automatically than orally expressed choices and insights from dual processing theory, it is reasonable to assume that the modality of manual choice expression constitutes an external antecedent of Type 2 processing. More specific, in this study it is conjectured that while oral choices are made automatically in line with default Type 1 processing, manual choices are likely to induce rational Type 2 processing.

3.2.2 Manual Choice Expression as External Antecedent of Type 2 Processing

In the field of neuroscience ample studies indicate that motoric movement and the utterance of words induce activity in different regions of the human brain (Ackermann/Riecker 2004; Frith et al. 1991; Wilson et al. 2004). Interestingly, it appears that besides a spatial difference, these regions also seem to differ to the extent to which they are involved in the execution of higher cognitive processing (Cavanna/Trimble 2006; Kuo et al. 2009; Luo/Ding/Luo 2004). More specific, it seems likely that intended motoric actions trigger activity in the dorsal/caudal part of the ACC, while the verbal expression seems to cause activation in the rostral/ventral part of the ACC (Paus et al. 1993). Because the dorsal/caudal part is assumed to be involved in higher cognitive processing and deliberation, and because the rostral/ventral part of the ACC is widely regarded as the affective part of the ACC (Bush et al. 2000; Qiu et al. 2007), it can be conjectured that motoric action induces cognition. In line with the default interventionist theory, which implies that individuals only engage in cognitive Type 2 processing if it is internally or externally triggered, it is therefore reasonable to assume that manual expression of choice (e.g., a motoric action) constitutes an external trigger of Type 2

processing. Consequently, as oral choice expression does not trigger activity in brain areas involved in higher cognition, it is reasonable to assume that Type 2 processing is not triggered and thus Type 1 processing is retained.

3.2.3 Rationality of Choice and Dual Processing

Decisions and choices can differ to the extent whether their outcome can be considered as being an objective or subjective matter (Inbar/Cone/Gilovich 2010). In this paper an ORC is defined as choosing the 'best' option, which asymmetrically dominates all remaining options in a given choice set (Bettman/Luce/Payne1998; Mikels et al. 2011).

As the direct assessment of Type 2 processing would require advanced imaging techniques (Qiu et al. 2007), assessing Type 2 processing indirectly constitutes the most commonly applied method in the field of social psychology and the research of consumer behavior (Toplak/West/Stanovich 2011). In other words, the presence of Type 2 processing is deduced if participants act and decide as if they would be processing according to Type 2 in line with preassigned experimental manipulations (Alter et al. 2007; Inbar/Cone/Gilovich 2010). Accordingly, in this study it is assumed that the appearance of an ORC can be considered to be a proxy for Type 2 processing.

3.3 Hypothesis Development

Summarizing the argumentation given above, it is conjectured that manual choice expression induces cognitive deliberation and therefore constitutes an external trigger for Type 2 processing. Further, because research implies that oral choice expression does not induce deliberation and seems to be elicited automatically (e.g., Bock 1996), it is reasonable to assume the modality of oral choice expression does not trigger Type 2 processing. As research implies that Type 2 processing increases the likelihood of making an ORC (Toplak/West/Stanovich 2011), the following testable hypothesis is formulated:

H1: Individuals expressing their choice manually are more likely to make an ORC than are individuals expressing their choice orally.

To test this hypothesis three laboratory experiments were designed in which participants were confronted with different choice tasks that were ought to assess the likelihood of making an ORC and thus engaging in Type 2 processing. That is, although the design and content of the choice tasks differed, they all shared two common factors: First, unknown to the participants, it was manipulated whether choices had to be expressed manually or orally. Second, as the direct assessment of Type 2 processing is difficult as outlined before, all experiments comprised choice tasks to indirectly assess Type 2 processing, that involved one objectively rational and (at least) one incorrect, but intuitively appealing option.

3.4 Current Research: Methods to Assess Types of Mental Processing

Over the last decades ample studies attempted to develop reliable and empirically applicable methods to assess the likelihood that individuals process information or fulfill experimental tasks according to Type 1 or Type 2 processing. As the direct assessment of the mental processing types is virtually impossible, the assessment of the probability of making an ORC has become an often applied proxy to indirectly assess Type 2 processing (Toplak/West/Stanovich 2011). Because the present research is interested in the impact of different choice expression modalities on the likelihood of making an ORC, the experimental designs and choice tasks were chosen and adjusted accordingly. For this purpose, the 'Monty Hall Three Doors Game' (Experiment 1), the 'Critical Reasoning Task' (Experiment 2a) 'Syllogism Reasoning' (Experiment 2b) and the 'Ration-Bias Paradigm' in form of a 'Marble Choice Experiment' (Experiment 3) were applied. These tasks constitute very common methods for this kind of investigation (Evans/Over 2013; Toplak/West/Stanovich 2011) and offered the opportunity for oral and manual choice expression.

3.4.1 Monty Hall's Three Doors Game

In the original 'Monty Hall's Three Doors Game' (hereafter simply 'Monty Hall Game') known from the US TV quiz-show 'Let's make a deal' contestants are shown three closed doors and are told that behind one door would be a prize, while behind the other two doors would be losses ('goats'). After contestants make an initial decision and choose one of the doors, the show master (i.e., Monty Hall) opens one of the remaining doors featuring a loss. Hereafter, he asks the contestants whether they would like to stay with their initially chosen

still unopened door or whether they now would rather like to switch and choose the other, still unopened door. It seems intuitively appealing that all doors have the same fixed likelihood of winning (i.e., one third). Therefore, it appears irrelevant whether one sticks to one's initial choice or whether one switches and chooses the other still closed door. In fact, if this was true, it would even be more rational to stick with one's initially chosen door compared to switching it, because individuals tend to perceive losses as less severe when they originate from passive rather than active actions (Gilovich/Medvec/Chen 1995).

However, the fact that one 'non-winning' door is opened affects the winning probability of the remaining doors. The rationale behind this phenomenon might be counter-intuitive at first glance, but becomes obvious after some deliberation. The initially chosen door of the constant wins with a probability of one-third (e.g., the prize is behind the chosen door) and loses with a probability of two-third (e.g., the prize is behind one of the non-chosen doors). This implies that the show master's doors win with a probability of two-thirds and lose with a probability of one-third. These a-priori odds are unaffected by the fact that the show master opens one of 'his doors'. Because the show master knows behind which door the great prize is hidden and he always opens a door featuring a loss (i.e., rule of the game), the contestant can double her odds of winning by switching her initially chosen door (Gillman 1992; Nalebuff 1987). Switching one's initial choice after one loss is revealed can therefore be considered as ORC (Fox/Levav 2004; Friedman 1998).

3.4.2 Cognitive Reflection Test

The Cognitive Reflection Test (CRT) was initially created by Frederick (2005) to assess whether individuals process tasks or information with a rather reflective and cognitive (e.g., Type 2) or with a rather reflexive and intuitive (e.g., Type 1) mindset. The original CRT comprises three open-end questions, each possessing one incorrect, but intuitively appealing and one correct answer that requires some deliberation effort. The underlying idea of the CRT is that overriding the urge to give the intuitive, but incorrect answer requires reflective deliberation and that consequently the number of correct answers (i.e., ORC) can be seen as proxy for Type 2 processing. For instance consider the first question of the CRT:

> A bat and a ball cost $1.10 in total. The bat costs a dollar more than the ball. How much does the ball cost?

The reflexive answer is 10 cents, as one intuitively subtracts the values 1.10$ and 1$ given by the question. However, the correct answer is 5 cents, which becomes salient once the result is reconsidered.

Existing research has shown that the context but also the manner in which the CRT is presented influences the performance on the CRT (see for an overview Evans 2011). Particularly, Alter et al. (2007) show that the performance on the CRT can be enhanced if Type 2 processing is externally triggered by the experimental design. By altering the font and size of the text of the CRT into a 'hard-to-read' design, the authors decreased the processing fluency and thereby activated Type 2 processing (Stanovich/West 2000). As a result, participants who read this 'disfluent' version of the CRT gave significantly more correct answers than did participants who faced the CRT in a fluent, 'easy-to-read' font. This finding implies that the CRT is a suitable method to assess Type 2 processing.

3.4.3 Syllogism Reasoning

Syllogism reasoning (hereafter simply 'syllogism') is a very commonly applied method to investigate Type 2 processing (Evans/Over 2013; Qiu et al. 2007). Although various variants of syllogism exist, the basic structure is often very similar. The general pattern behind this logical argument is whether one can deductively arrive at a conclusion based on two or more premises that are assumed to be true. One very common and repeatedly empirically used variant of a syllogism comprises two premises and asks whether a final conclusion is true or false based on the premises (see Khemlani/Johnson-Laird 2012 for an overview). Even though all syllogisms require some deliberative effort, the level of difficulty to derive the correct answer can vary tremendously (Stanovich/West 2000). Particularly, research indicates that when the conclusion is true (false) based on the premises, but false (true) based on common knowledge, choosing the correct answer requires reflective thinking and thus Type 2 processing (Campitelli/Gerrans 2014; De Neyes 2006; Sa/West/Stanovich 1999). Syllogisms of that structure are therefore applied in the present study.

3.4.4 Ratio-Bias Phenomenon

The 'Ratio-Bias Phenomenon' (RBP) (Denes-Raj/Epstein 1994; Inbar/Cone/Gilovich 2010) is based on the observation that individuals perceive the probability of a certain incident as more

likely when it is presented in large rather than in small numbers (Miller/Turnbull/McFarland 1989). For instance, research shows that individuals perceive an event as less likely to occur when it appears once in ten times compared to when it appears ten in hundred times. Even though the absolute ratios are identical, individuals seem to prefer options with more 'absolute winners' (Kirkpatrick/Epstein 1992). Further, Inbar/Cone/Gilovich (2010) and Denes-Raj/Epstein (1994) found that this preference could even cause irrational decisions. They observed that participants preferred choosing from a bowl with more absolute winners over choosing from a bowl that contains less absolute winners, even if the bowl with less absolute winners possess a higher relative ratio of winning tokens. Interestingly, Inbar/Cone/Gilovich (2010) found that participants are less likely to make this objectively irrational choice in this decision situation if cognition had been externally triggered (i.e., Type 2 processing is activated). In other words, the RBP is a suitable method to compare the effect of internal cues on mental processing by simultaneously controlling the impact of external processing cues. In this dissertation the RBP is applied in form of a 'Marble Choice Experiment' comparable to the set-up of the study by Inbar/Cole/Gilovich (2010). Table 2 summarizes the three choice tasks applied in this study, their main purposes and the most relevant sources.

Table 2: Overview of Experiments, Study 1

Experiment #	Choice Task	Assessment of ORC	Relevant sources
Experiment 1	Monty Hall Game	After initial choice of one out of three envelopes, one non-winning enveloped is revealed and participants are asked to keep or to switch their initial choice; ORC is switching of initial choice after one non-winning item is revealed.	Friedman 1998; Gilovich/Medvec/Chen 1995; Granberg/Brown 1995; Krauss/Wang 2003
Experiment 2a	CRT	Three questions of which each possess one intuitive, but incorrect and one reflective, but correct answer; ORC is the number of correct answers.	Alter et al. 2007; Campitelli/Labollita 2010; Frederick 2005
Experiment 2b	Syllogism	Assessment whether a conclusion follows logically from two premises; ORC is the correct assessment of a conclusion although it contradicts common belief.	De Neyes 2006; Khemlani/Johnson-Laird 2012; Sa/West/Stanovich 1999
Experiment 3	RPB (Marble Choice Experiment)	Choice between two bowls one featuring less absolute, but more relative winning tokens (small bowl) than the other bowl (large bowl); ORC is choosing the small over the large bowl.	Denes-Raj/Epstein 1994; Kirkpatrick/Epstein 1992; Inbar/Cone/Gilovich 2010

3.5 Experiment 1 'Monty Hall Game'

To test the hypothesis that manual choice expression is more likely to yield an ORC than oral choice expression, the 'Monty Hall Game' was applied in a laboratory experiment (Gilovich/Medvec/Chen 1995). In this choice task the proxy for Type 2 processing is the likelihood of switching one's initial choice, which is considered to be the ORC.

As outlined in Chapter 3.4.1, this game features three choice options among which only one contains a prize. In total the game comprises three game stages. After expressing an initial choice for one of the three options (i.e., phase 1), participants are informed that one of the non-chosen options does definitely not feature the prize (i.e., phase 2) and are subsequently asked whether they want to stay with their initial choice or want to switch (i.e., phase 3). A schematic overview of the game phases is provided in Figure 3.

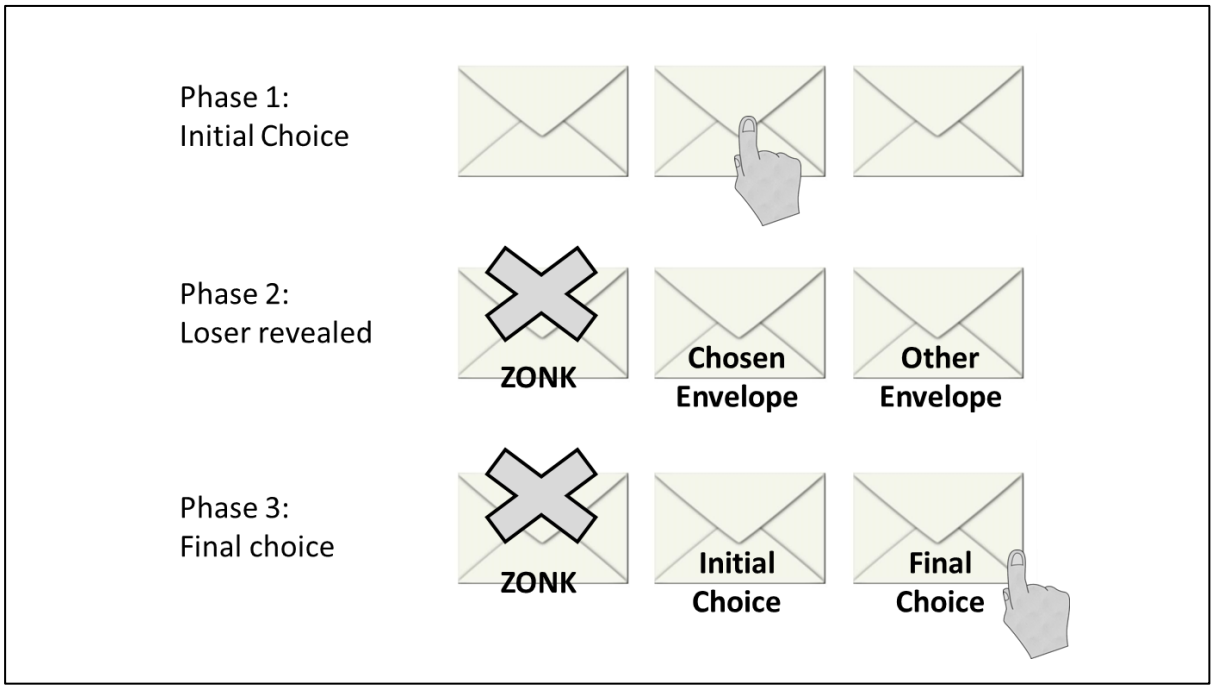

Figure 3: Game phases of the Monty Hall Game, Experiment 1, Study 1

Because switching one's initial choice is the ORC in this situation and because it is conjectured that only manual choice expression induces Type 2 processing, it is predicted in line with H1 that participants expressing their initial envelope choice by taking it (i.e., manual choice condition) are more likely to change the initial envelope choice after one 'non-

winning' envelope is revealed than are participants expressing their choice by saying which envelope they want to initially choose (i.e., oral choice condition).

3.5.1 Method

Ninety-nine undergraduate students (55.6% Males, M_{Age} = 21.06 years, SD_{Age} = 8.54) participated in this experiment in exchange for partial course credit. The laboratory experiment was a single-factor between-subjects (manual vs. oral choice condition) design and was conducted on three consecutive days (Wednesday to Friday, approximately 9:00 am to 3:00 pm). Participants were seated in individual computer cubicles and were informed about the 'Monty Hall Game' and the overall procedure via a computer screen. They were told that they would be escorted to a separate room where they would be asked to choose one out of three envelopes lying next to each other on a table in the order 'left', 'middle', 'right' and that each envelope would contain a card featuring a different letter (see picture 1, General Appendix I). Participants were informed that they could only choose one of the three envelopes and that in case their envelope would contain the card with the 'winning-letter' they would have the opportunity to participate in a lottery to win a Samsung galaxy tablet pc. A lottery was applied to ensure a sufficient incentive for participants to be committed to the game, but at the same time to keep the experimental costs reasonable (e.g. Inbar/Cone/Gilovich 2010). As experimental manipulation approximately half the participants were instructed to express their envelope choice manually by taking one envelope without talking to the attending research assistant (i.e., manual choice condition, N = 51), while the other half was instructed to express their envelope choice orally by saying the position of the envelope they would like to choose to the research assistant (i.e., oral choice condition, N = 48).

After reading the instructions, participants were led to the separate room where the three envelopes were positioned on a table and the research assistant was standing behind it. The position of each envelope on the table was clearly marked by signs featuring the position ('left', 'middle', 'right'). Participants made their envelope choice as instructed and to exclude potential effects due to 'mere touch' (Gilovich/Medvec/Chen 1995; Peck/Shu 2009), participants in the oral choice condition were handed their chosen envelope. Eventually, participants were asked to return to their cubicle with their chosen envelope in their hands and

to continue with a computer based questionnaire. They were instructed to keep their envelope closed until they would be explicitly instructed to open it.

In line with the original 'Monty Hall Game', participants were then informed by the computer that one of the remaining two not-chosen envelopes would not include the card with the 'winning-letter' (e.g., 'non-winning' envelope). With this knowledge, they were asked whether they would like to keep their initially chosen envelope (i.e., stay) or whether they would like to switch and choose the other still unopened envelope (i.e., switch). Noteworthy, this decision was entered into the computer-based questionnaire and took place in private (i.e., in the cubical without the attendance of a research assistant or any other person). In case participants decided to switch their envelope, they were informed by the computer that this decision would be remembered for the lottery. However, participants were not physically handed the other envelope. After participants indicated their choice to 'stay' or to 'switch', they continued with questions about their knowledge about the game and their demographics. After that, they were thanked and dismissed.

As research implies that internal factors, such as the subjective preference and situational motivation to process and act according to Type 2 processing might influence the likelihood of making an ORC, control variables were included (e.g., Chaiken 1980; Chaiken/Maheswaran 1994). More specific, to control subjective preferences to process and act according to Type 2, the short version of the rational experiential inventory (REI) scale was included (consisting of the subscales 'need for cognition' (NFC) and 'faith in intuition' (FI), see Epstein et al. 1996).[1] To assess the motivation and commitment of participants to the game they were asked to estimate the price of the prize (e.g., the tablet) and additionally how much money they demand to withdraw the potential opportunity to participate in the lottery (see Inbar/Cone/Gilovich 2010 for a comparable approach). As a proxy for motivation an 'uninvolved-score' was calculated by subtracting the amount to withdraw the chance of joining the lottery from the estimated price. A higher 'uninvolved-score' thus implies lower motivation to participate in the game. Further, because the general knowledge of the 'Monty Hall Game' might influence the likelihood of switching one's initial choice, participants were asked whether they '*knew the game before*' on a seven-point Likert scale (1 = strongly disagree, 7 = strongly agree).

[1] Cacioppo et al. (1996) showed a positive correlation between high NFC scores and the likelihood of making an ORC. However, because NFC is a self-reported measure, it is only considered as proxy for *personal preference* and not as *actual ability* to engage in Type 2 processing..

3.5.2 Results

To assess whether manual choice expression modalities increase the likelihood of making an ORC in line with H1, switching behavior was investigated. As expected, among participants in the manual choice condition 35.3 % indicated a willingness to switch their initially chosen envelope, while among participants in the oral choice condition only 16.7 % decided to switch after one 'non-winning' envelope was uncovered. This difference reached the threshold of being statistically significant χ^2 (1, N = 99) = 4.43, p = .035 and is in line with H1. Figure 4 provides a visual representation of this result.

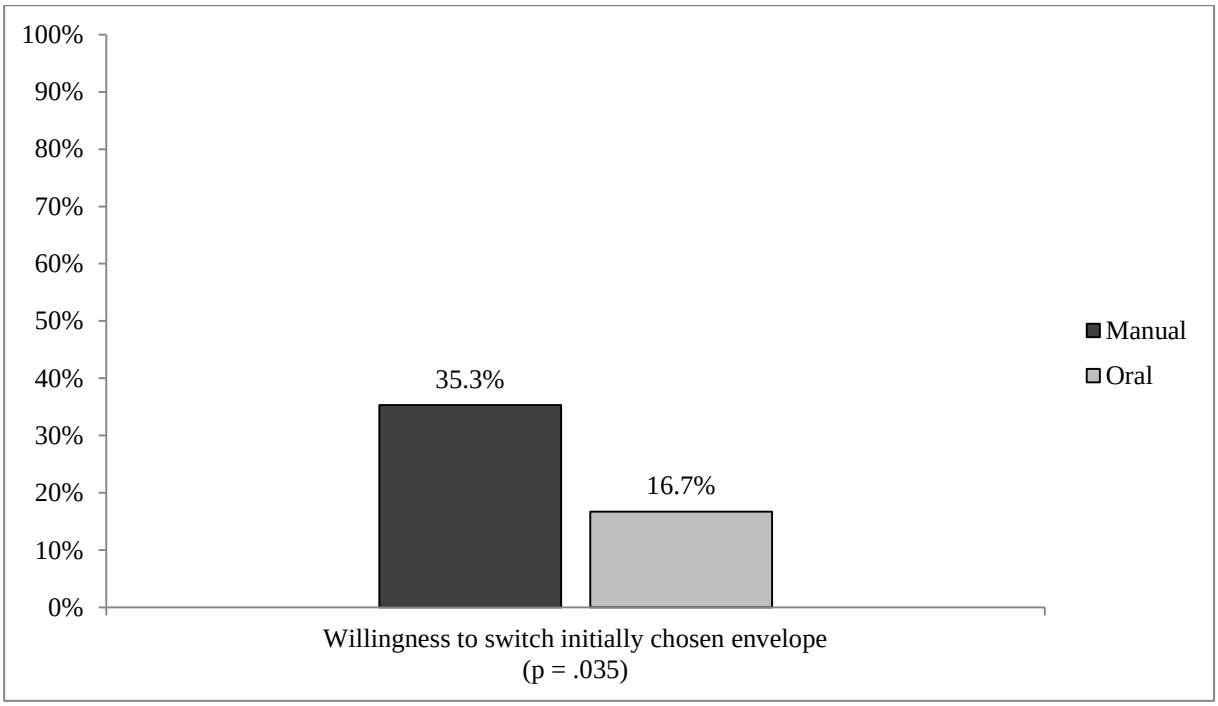

Figure 4: Switching intention per experimental group, Experiment 1, Study 1

Next the control variables were considered. First, it was assessed whether the general knowledge of the 'Monty Hall Game' differed among participants, as a difference between conditions might impact the ORC (i.e., switching choice). However, the results reveal that knowledge of the game was not significantly different between conditions (M_{Manual} = 1.71, SD_{Manual} = .46 vs. M_{Oral} = 1.75, SD_{Oral} = .44, F(1, 97) = .24, p = .63). Further, a one sample t-test shows that the overall sample mean (M_{Total} = 1.73, SD_{Total} = .45) was significantly smaller than the center of the scale (M_{Scale_center} = 4.00, p < .0005). This indicates that in general participants were unaware of the Monty Hall Game.

In order to rule out the possibility that participants differed in the preference to engage in Type 2 processing, the NFC (α = .6) and FI (α = .82) sub-scales of the REI were created (Epstein et al. 1996). The results reveal that participants in the manual choice condition did not indicate a higher need for cognition (NFC) (M_{Manual} = 3.65, SD_{Manual} = .68) than did participants in the oral choice condition (M_{Oral} = 3.64, SD_{Oral} = .55, F(1, 97) = .01, p = .91). Similarly, faith in intuition (FI) was not significantly different between conditions (M_{Manual} = 3.68, SD_{Manual} = .75 vs. M_{Oral} = 3.79, SD_{Oral} = .68, F(1, 97) = .62, p = .43). Thus, the overall preference to engage in Type 2 processing was similar between conditions.

Next, the 'uninvolved-score' was calculated by forming the difference between the value participants indicated to be willing to withdraw their lottery participation opportunity and the estimated price of the prize. Although the 'uninvolved-score' was slightly higher for participants in the manual choice condition (M_{Manual} = 179.23, SD_{Manual} = 134.18) than for participants in the oral choice condition (M_{Oral} = 156.4, SD_{Oral} = 108.33), this difference was not statistically significant (F(1, 97) = .86, p = .36). This result implies that the general motivation to play the game was similar across conditions and generally fairly high (M_{Total} = 168.16, SD_{Total} = 122.25).

Finally, binary regressions with 'switching' as dependent variable and condition as categorical independent variable further indicates that the observed main effect remains significant even after controlling for knowledge of the game (p = .044), NFC (p = .04), FI (p = .047), and the 'uninvolved-score' (p = .043), while none of the control variables reached statistical significance in any regression model.

3.5.3 Discussion Experiment 1

Switching one's initial choice after one loser is revealed is the ORC in the Monty Hall Game. In line with the assumption that manual choice expression triggers Type 2 processing, and that Type 2 processing increases the likelihood of making an ORC, the results of Experiment 1 show that participants expressing their initial envelope choice manually were more likely to switch their choice after one 'non-winning' envelope was revealed compared to participants in the oral choice condition. Thus, Experiment 1 supports the main hypothesis (H1) and indicates that manual choice expression is an external antecedent of Type 2 processing. Further, other alternative explanations for the present results could be rejected by the obtained

data. That is, research implies that situational motivation can be an internal antecedent of Type 2 processing which could increase the chances of making an ORC (e.g., Petty/Cacioppo 1986). However, the assessment of the 'uninvolved-score' as proxy for motivation to play the game did not yield a significant difference between conditions. Further, it could be demonstrated that the main effect of manual choice expression on the ORC (i.e., switching behavior) remains significant after controlling for motivation. Therefore, it is unlikely that the observed effect occurs due to different levels of motivation to play the game among participants. In addition, research implies that the personal preference to cognitively process information might impact the likelihood of Type 2 processing. This issue was addressed by assessing the NFC and FI. The results indicate no significant difference between conditions for these measures and imply that the main effect of manual choice expression on switching behavior remains significant after controlling for NFC and FI. This implies that the observed effect on making an ORC cannot be explained by internal antecedents (e.g., motivation and preference for Type 2 processing), but only by a difference in the modality of choice expression (i.e., external antecedent).

Although Experiment 1 provides initial support for H1 and ruled out some alternative explanations for the observed effect, there are still some potential constraints that need to be discussed. For instance, even though the controls imply that participants in both experimental conditions were equally aware of the 'Monty Hall Game' and possessed similar levels of subjective processing preference and motivation, one cannot explicitly exclude the alternative explanation that switching participants were generally more capable to process the underlying probabilities correctly. Thus, participants might have made the ORC due to cognitive ability regardless of the experimental manipulation and knowledge of the game (e.g., Stanovich 2011). Moreover, in total only a small fraction of 26.3 % of the participants indicated a will to switch. This indicates that making the ORC and overcoming the intuitive assumption that staying and switching yield the same probability to win appears to be fairly difficult. Therefore, one could argue that some participants were engaging Type 2 processing, but due to a general lack of mental ability they were still not able to make the ORC. In other words, the ORC might be a rather conservative proxy for assessing Type 2 processing in this specific case.

Further, the choice participants made (i.e., stay or switch) was a binary and singular choice. Although binominal tests reveal that for both conditions the odds of staying or switching do

significantly deviate from chance (e.g., manual choice condition: $p = .049$; oral choice condition: $p < .0005$), one cannot entirely rule out the possibility that these odds might approach chance if the game was repeatedly played (see for instance Friedman 1998 for a discussion on repeated Monty Hall Games). Experiment 2 is intended to address these issues by utilizing different methods and proxies to assess the likelihood of making an ORC.

3.6 Experiment 2 'CRT (a) and Syllogism (b)'

Experiment 2 was intended to replicate the main effect in an again different context and to concomitantly address the potential issues raised by Experiment 1. Therefore, a lab experiment was conducted in which the probably most common methods for assessing the likelihood of making an ORC were applied: Cognitive Reflection Test (CRT) and syllogism reasoning (Evans 2011; Frederick 2005). Although research implies that for both methods the assessment of the likelihood of making an ORC (i.e., reveal Type 2 processing) is independent from the general cognitive ability of individuals (Toplak/West/Stanovich 2011), it is reasonable to oppose that the CRT and syllogism differ in their level of difficulty and skill requirement. While CRT requires at least some mathematical ability, syllogisms demand a certain feeling for argumentation structure logic and language to make the ORC (Campitelli/Gerrans 2013). Therefore, both tasks were included in one experiment with two subparts (i.e., a and b) to control the impact of general ability.[2] Moreover, since the CRT is a non-binary decision problem and both methods constitute repeated decisions, Experiment 2 (a, b) addresses the problem of a binary singular choice raised in the discussion part of Experiment 1.

To assess whether the choice expression modality (i.e., manual versus oral) influences the likelihood of making an ORC (i.e., giving correct answers as proxy for Type 2 processing), the choice tasks had to be adjusted so that it was feasible to answer the CRT and the syllogism in an experimentally pre-assigned choice expression modality.

[2] Reasoning: minor and individual forms of dyscalculia and dyslexia can influence the CRT and syllogism performance independent from the actual processing style.

3.6.1 Design CRT

For the CRT the three original questions were applied (Frederick 2005). However, instead of the original open-ended version a paper-based multiple-choice variant was developed. This adjustment was necessary, because answering the test manually requires a design with a finite number of answers so that participants could physically 'take' an answer. Further, by providing answer options participants were obligated to 'choose one answer option', so that it was actually possible to make an ORC.

Hence, the CRT was printed on a standard DIN A4 sheet featuring the three CRT questions. For each question six answer options were provided. These answer options were printed in parallel directly below a CRT question and were sequentially, alphabetically labeled (A-F). The answer options always included the correct answer, the intuitive answer and four reasonable filler answers. The filler answers were designed in a form that the position of the intuitive and the correct answer within the six answer options differed among the three questions to impede the possibility that participants would answer the questions correctly by applying any kind of heuristic order rule (see Table 3 for an overview). The final CRT sheet including all answer options can be found in the General Appendix III.[3]

CRT Question	Correct answer	Intuitive Answer
Q1	B	C
Q2	A	E
Q3	F	D

Table 3: Answer positions CRT, Experiment 2 (a), Study 1

To test the main hypothesis and to investigate whether choice expression modality impacts the likelihood of making an ORC, participants were manipulated to either answer the CRT orally or manually. In the oral choice condition, participants were instructed to say the letter of the answer, which they thought was correct. This letter was then marked by a research assistant. In the manual choice condition, participants were instructed to 'take' the letter of the

[3] Note: the word 'widget' in the second CRT Question was replaced by the more common and comprehensive word 'machine'.

answer they thought was correct by removing a small piece of paper featuring the letter that was loosely attached to the CRT sheet. To ensure that the mere presence of the research assistant in the oral choice condition would not influence the results, he was also attendant for participants in the manual choice condition.

Although research indicates that the total number of correct answers (i.e., ORC) in the CRT is a proxy for Type 2 processing independent from general ability and preference to engage in Type 2 processing, it is likely that CRT solving ability requires at least some mathematical capacity. Further, some studies imply that although overall intelligence and cognitive capacity is not a perfect predictor for CRT performance, these measures are still highly correlated (Toplak/West/Stanovich 2011). Experiment 2 therefore also included a syllogism reasoning task (Alter et al. 2007; De Neys 2006) which is fairly unaffected by mathematical capacity.

3.6.2 Design Syllogism

For the syllogism task, four individual syllogisms were designed. Each syllogism consisted of two premises and one conclusion, which was definitely true or definitely false based on the two premises. To vary the level of difficulty among syllogisms, the empirical recommendations of Khemlani/Johnson-Laird (2012) were closely followed (see Table 4).[4]

	Conclusion *True* based on the premises	**Conclusion *False* based on the premises**
Conclusion *True* based on common knowledge	Very Easy	Very Difficult
Conclusion *Fals*e based on common knowledge	Very Difficult	Very Easy
Conclusion is not affected by common knowledge	Easy	Difficult

Table 4: Categorization of difficulty level of syllogisms, Experiment 2 (b), Study 1

[4] Note that this categorization is based on the assumption that the syllogism comprises exact two premises and one conclusion and can be answered as false or true. Other possible syllogism reasoning problems exist; for an extensive review see Khemlani/Johnson-Laird (2012).

As the meta-analysis of Khemlani/Johnson-Laird (2012) indicates that 'Very Easy' syllogisms are mostly answered correctly, syllogism of that form were neglected and only 'Easy', 'Difficult', and 'Very Difficult' syllogisms were applied in the present experiment. Accordingly of the four total syllogisms, two of them were 'Very Difficult' syllogism reasoning questions and were adopted from the pioneer work of Markovits/Nantel (1989). The other two were 'Easy' and 'Difficult' syllogisms that were subsequently created by slightly adjusting the pre-knowledge conflicting content of the two 'Very Difficult' syllogisms. This design was ought to disentangle the general ability to answer a syllogism correctly and the ability to answer it correctly even if the conclusion appears incorrect based on common knowledge which can be seen as proxy for Type 2 processing (Campitelli/Gerrans 2013; De Neys 2006).

As for the CRT, a multiple choice version of the syllogism task had to be created, so that it was possible to give answers manually and 'choose' one answer option. To this end, the syllogism design of De Neys (2006) was mimicked and two answer choices *'The conclusion follows logically from the premises'* and '*The conclusion does not follow logically from the premises'* labeled as A or B were provided.[5] More specifically, similar to the design of the CRT participants in the manual choice condition were instructed to 'take' the answer which they thought was correct by removing a small piece of paper featuring the letter 'A' or 'B' that was loosely attached to the syllogism sheet, while participants in the oral choice condition were instructed to say which answer they thought was correct (i.e. by saying 'A' or 'B'), which was sequentially marked by the research assistant. The syllogism reasoning tasks were printed on two sheets for the sake of clear arrangement. The first sheet featured the 'Easy' and the 'Difficult' syllogisms, while the second sheet featured the two 'Very Difficult' syllogisms (the final design and the syllogism questions can be found in the General Appendix IV).

3.6.3 Method

Eighty-eight students (52.3% Males, M_{Age} = 20.84 years, SD_{Age} = 1.51) participated in this one factor between subject design experiment in return for partial course credit. Participants were invited to come to the lab for individual sessions that were scheduled throughout one week

[5] It was randomized whether A or B indicated either 'The conclusion does not follow logically from the premises' or 'The conclusion follows logically from the premises' to prevent any order bias.

and took place in the morning and afternoon (Monday to Friday, approximately from 10:00 am to 3:00 pm). After arrival participants were guided to a small room with a bar table. The experimental task was paper based and comprised a total of five sheets which were placed upside down on the bar table. The first sheet included three lines of introduction, the manipulation and the multiple choice version of the CRT (i.e., Experiment 2a). As experimental manipulation participants were either asked to give their answers manually (i.e., 'manual choice condition' by removing the little pieces of paper featuring the letters of the answers, N = 44) or orally (i.e. 'oral choice condition' by saying the letter of the answer, N = 44). After participants answered all CRT questions, the CRT sheet was taken away and participants continued with a second sheet featuring two control questions ('*The questions were easy to answer*' on a seven-point Likert scale 1 = I strongly agree; 7 = I strongly agree; '*I knew at least one of the three questions before*' as binary yes/no question).

The control sheet was then removed and participants continued with the syllogism task printed on two sheets (i.e., Experiment 2b). After participants answered the last question of the syllogism task, the sheets were taken away and participants continued with a second control sheet to assess the subjective performance and difficulty of the syllogism task with the same two control questions used in the CRT before. Subsequently, participants continued with an unrelated study in which course demographic information was assessed.

Because answering the CRT questions and the syllogism task correctly requires Type 2 processing, it was proposed that participants expressing their answer manually would choose significantly more answers correctly than would participants expressing their answer choice orally. However, because these tasks differ in their difficulty and require different levels of a general ability to perform Type 2 processing, it was further assumed that for the CRT there would not be a significant difference for choosing all answers correctly as this would be a rather proxy for general and not context-specific ability to engage in Type 2 processing. For the syllogism a somewhat counterfactual effect was predicted. Since the difficulty of the questions was adjusted and included an 'Easy' syllogism, it is proposed that there would not be a significant difference between conditions for choosing no or at least one correct syllogism answer. Note that answering no question correctly would rather indicate a general lack of the ability to engage in Type 2 processing (Campitelli/Gerrans 2013). However, because two 'Very Difficult' syllogisms were included, it is proposed that participants expressing their answer choice manually are more likely to answer three or more syllogisms

correctly compared to participants expressing their answer choice orally, as the correct answer choice of a very difficult syllogism particularly requires the engagement of Type 2 processing. Finally, it was predicted that significantly more participants in the manual choice condition than in the oral choice condition would answer the 'Very Difficult' syllogism correctly.

3.6.4 Results CRT

CRT performance was pursuit following the recommendation of Frederick (2005). More precisely, correct answer choices were coded as 1 and incorrect answer choices were coded as 0. The addition of these numbers per participant yielded a composite CRT score reaching from 0 to 3 (see also Alter et al. 2007 for similar approach). Higher CRT scores indicate a higher likelihood of making an ORC and thus Type 2 processing. [6] As expected, participants in the manual choice condition reached higher CRT scores (M_{Manual} = 1.14, SD_{Manual} = 1.0) than did participants in the oral choice condition (M_{Oral} = .45, SD_{Oral} = .79, $F(1, 88) = 12.55$, p = .001). Further, participants in the oral choice condition chose significantly more often the intuitive answer (M_{Oral} = 2.18, SD_{Oral} = .95) than did participant in the manual choice condition (M_{Manual} = 1.59, SD_{Manual} = .996, $F(1, 88) = 8.14$, p = .005). These results are displayed Figure 5 (black lines indicate standard errors of the means).

[6] Strictly speaking the number of correct answers is not a continuous variable. The results of a non-parametric Mann-Whitney test yield similar results and can be found in Table 11, General Appendix XI.

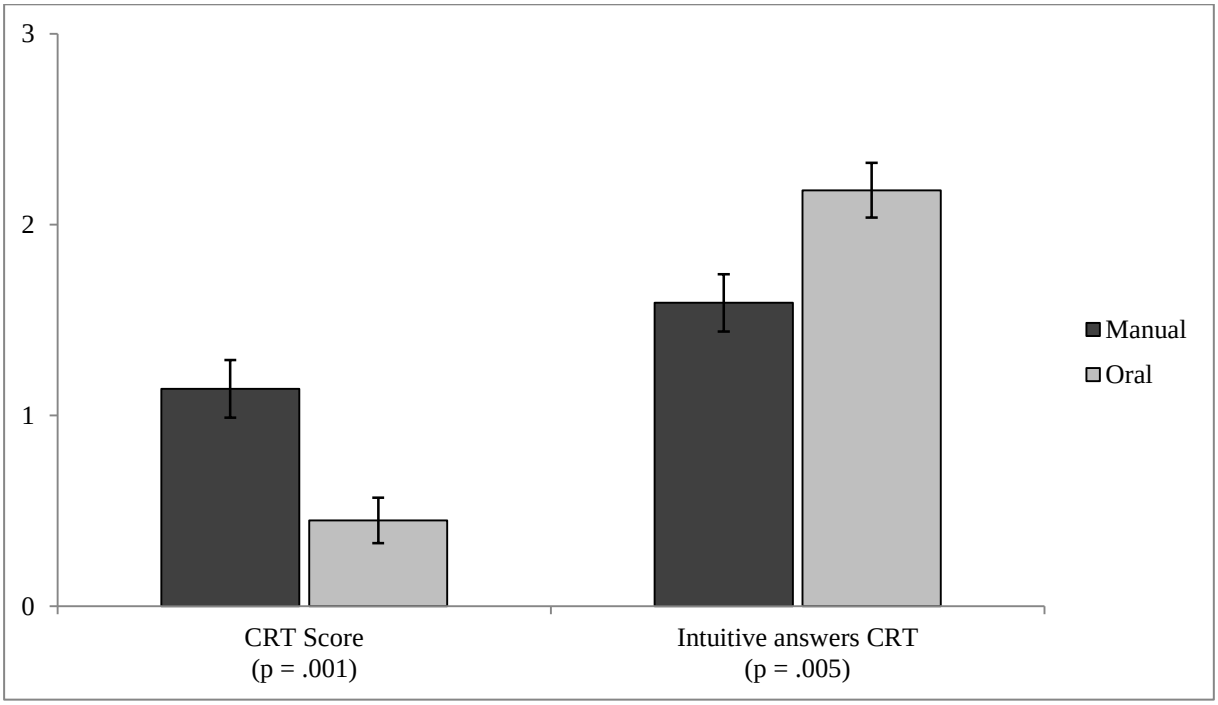

Figure 5: CRT Scores and number of intuitive answer, per experimental group, Experiment 2 (a), Study 1

Further, while 70.5% in the manual choice condition answered at least one question correctly, only 31.8% of the participants in the oral choice condition answered at least one of the three CRT question correctly (χ^2 (1, N = 88) = 13.14, $p < .0005$). However, in line with the assumption that for the CRT the fact of answering all questions correctly is more likely a proxy of general ability for Type 2 processing, it was found that the number of participants answering all three CRT questions correctly did not significantly differ between conditions (χ^2 (1, N = 88) = 2.2, $p = .14$). These results are displayed in Figure 6.

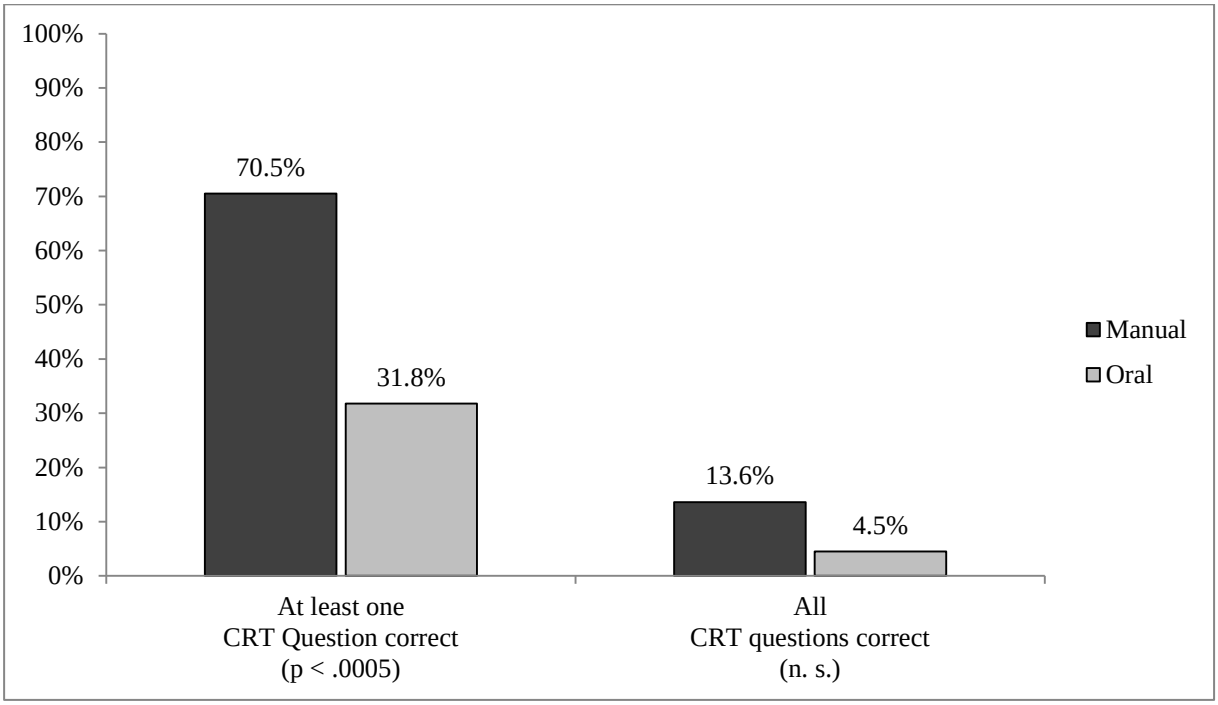

Figure 6: Percentage of participants answering at least one CRT and all CRT questions correctly per experimental group, Experiment 2 (a), Study 1

Finally, the control variables were assessed. Although it appeared that participants in the manual choice condition perceived the CRT questions as being slightly easier (M_{Manual} = 4.68, SD_{Manual} = 1.65) than did participants in the oral choice condition (M_{Oral} = 4.02, SD_{Oral} = 1.5), this difference was only marginally significant (F(1, 88) = 3.83, p = .054). However, controlling for '*The questions were easy to answer'* the effect of expression modality on CRT scores remained significant (p = .001), while the main effect of the control remains insignificant (p = .43). Eventually, there was no difference between conditions for knowing at least one CRT questions before (M_{Manual} = 34.1% vs. M_{Oral} = 25.0%, χ^2 (1, N = 88) = .87, p = .35).

3.6.5 Results Syllogism

Similarly to the procedure applied to the CRT results, a composite syllogism score that reached from 0 to 4 was created. Higher syllogism scores imply higher likelihood of making an ORC.[7] As expected, participants in the manual choice condition had significantly higher

[7] Strictly speaking the number of correct answers is not a continuous variable. The results of a non-parametric Mann-Whitney test yield similar results and can be found in Table 12, General Appendix XI.

syllogism scores (M_{Manual} = 3.55, SD_{Manual} = .70) than had participants in the oral choice condition (M_{Oral} = 3.00, SD_{Oral} = .92, F(1, 88) = 9.89, p = .002). This result is displayed in Figure 7 (black lines indicate standard errors of the mean).

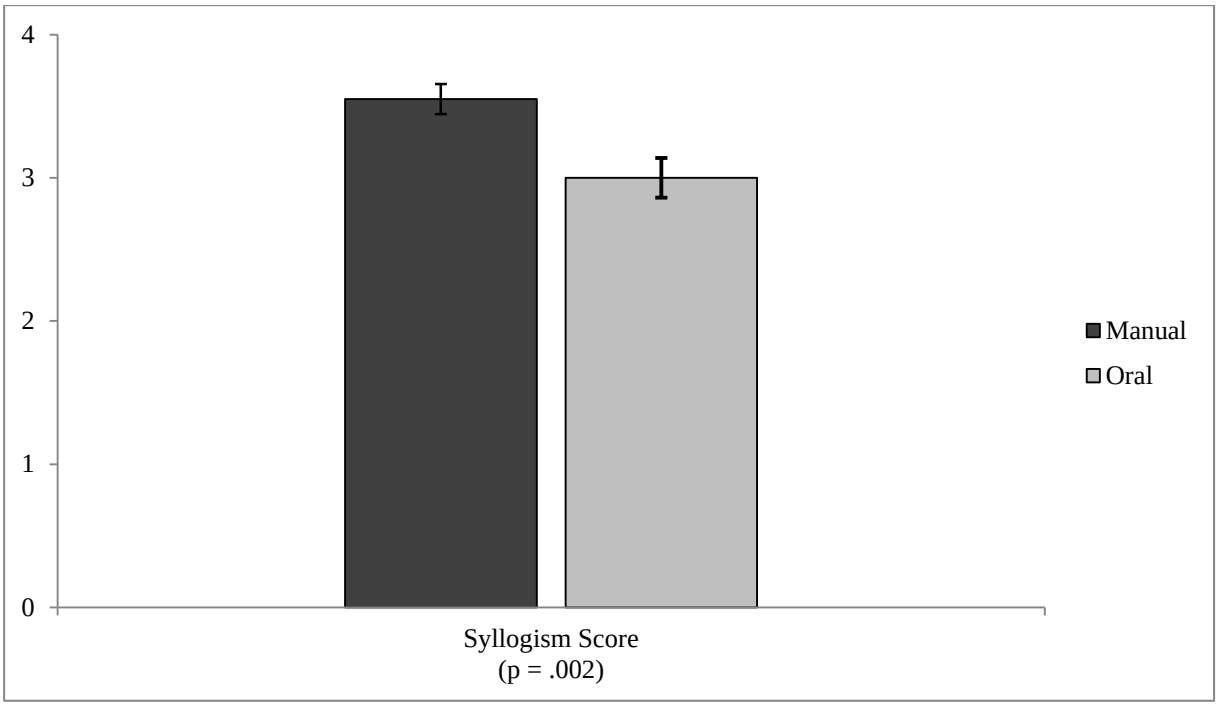

Figure 7: Syllogism score per experimental group, Experiment 2 (b), Study 1

In line the argumentation about the level of difficulty of the applied syllogism reasoning questions, all eighty-eight participants answered at least one of the syllogism correctly and the share of participants answering at least two questions correctly was also not significantly different between the conditions (p = .15). However, as expected, it was found that more participants in the manual choice condition answered at least three syllogisms correctly (M_{Manual} = 88.6%) than did participants in the oral choice condition (M_{Oral} = 68.2%, χ^2 (1, N = 88) = 5.44, p = .02). The same pattern was true for answering all four questions correctly (M_{Manual} = 65.9% > M_{Oral} = 36.4%, χ^2 (1, N = 88) = 7.69, p = .006).

Further, as predicted the percentage of participants answering both 'Very Difficult' syllogisms correctly was higher among participants in the manual choice condition (M_{Manual} = 70.5%) than among participants in the oral choice condition (M_{Oral} = 47.7%, χ^2 (1, N = 88) = 4.7, p = .03). These results are depicted in Figure 8.

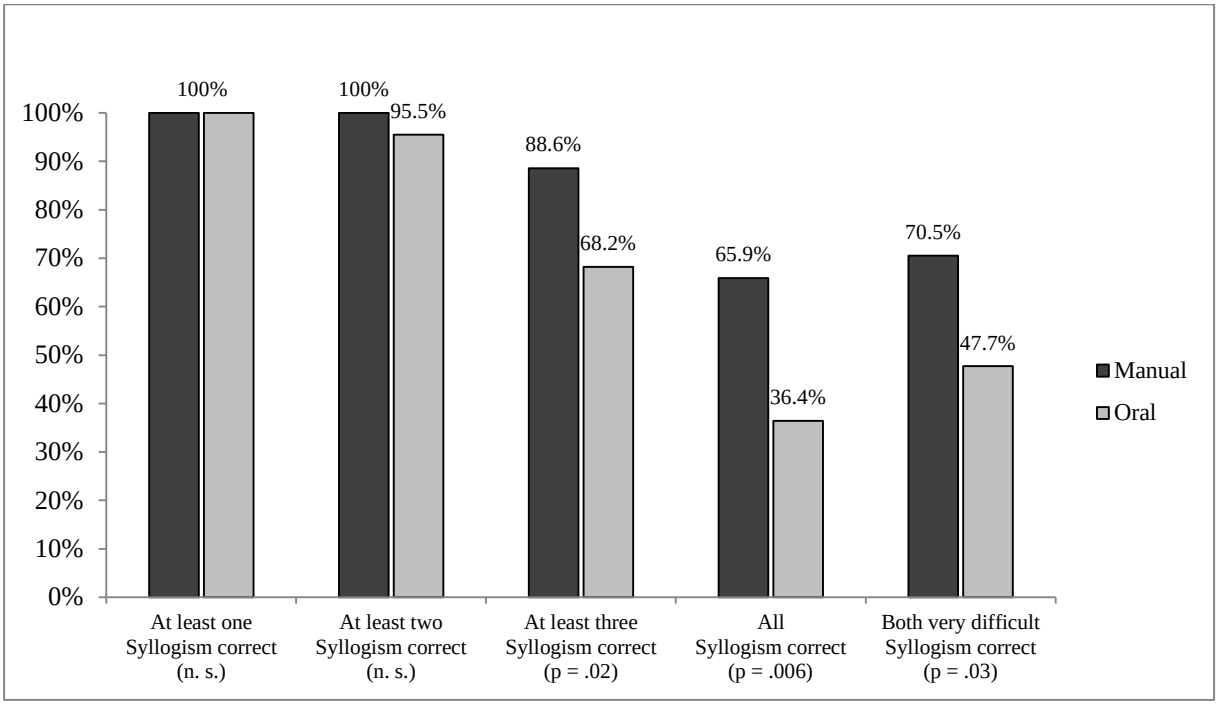

Figure 8: Percentage of correct answers per experimental group, Experiment 2 (b), Study 1

Finally, assessing the control variables revealed that participants in the manual choice condition perceived the syllogisms as slightly easier (M_{Manual} = 5.32, SD_{Manual} = 1.65) than did participants in the oral choice condition (M_{Oral} = 4.70, SD_{Oral} = 1.55). However, this difference was only marginally significant (F(1, 88) = 3.23, p = .08). Further, the effect of expression modality on syllogism scores remains significant after controlling for '*The questions were easy to answer'* (p = .005), while main effect of the control remains insignificant (p = .21). Finally, there was no difference between conditions in knowing at least one of the presented syllogisms before (M_{Manual} = 22.7 % vs. M_{Oral} = 22.7 %, χ^2 (1, N = 88) = .000, p = 1).

3.6.6 Discussion Experiment 2

Experiment 2 fulfilled two main purposes. First, it provided additional evidence for the hypothesis that expressing a choice manually increases the likelihood of making an ORC (i.e., a correct answer) in a different context. In particular, Experiment 2 revealed that participants instructed to choose their answer option manually had higher CRT and syllogism scores than had participants instructed to choose their answer option orally. As higher scores indicate a higher likelihood of making an ORC, the results are in line with H1.

Moreover, because answering the CRT and syllogism correctly is seen as proxy for Type 2 processing, the results imply that manual choice expression is an external antecedent of Type 2 processing. Further, Experiment 2 implies that the likelihood of making an ORC was not significantly affected by the general ability to engage in Type 2 processing. Remember that it was conjectured that individuals possessing a very augmented ability to engage Type 2 processing are likely to answer all CRT questions correctly, and that individuals possessing a very attenuated ability to engage Type 2 processing would probably answer only one or none syllogism correctly. However, Experiment 2 indicates that there is no difference between manual and oral choice expression for answering all CRT questions and at least one or none syllogism question correctly.

Although the results of Experiment 1 and Experiment 2 (a, b) indicate that manual choice expression is more likely to yield an ORC compared to oral choice expression in line with main hypothesis (H1), there are still some issues to address. For instance, social interaction or the effect of 'the mere touch' (Peck/Shu 2009) might still have an impact on the obtained results. Regarding social interaction, participants in the oral choice condition had to interact to some extend with another person (i.e., say their choice to the research assistant), while participants in the manual choice condition were not required to interact. The mere touch effect might have had an impact because other than participants in the oral choice condition, participants in the manual choice condition physically 'took' their choice. Further, although the obtained effects are line with the 'default-interventionist theory' (Evans 2007), the results cannot readily reject the alternative explanation that manual choice expression might not have increased the likelihood of making an ORC, but that rather oral choice expression might have attenuated the likelihood of making an ORC. Experiment 3 is intended to address these issues.

3.7 Experiment 3 'RBP, Marble Choice Experiment'

Experiment 3 fulfilled three purposes. First, by replicating the main effect that manually expressed choices are more likely to yield an ORC compared to orally expressed choices in an again different decision context, Experiment 3 is intended to prove the robustness of the initial results. Second, the potential problems that participants in the manual condition took their choices themselves and were not obligated to interact with the research assistant, while participants in the oral choice condition were handed their choice and were obligated to

interact with the research assistant was addressed. Finally, Experiment 3 was ought to show explicitly that the observed difference in making an ORC is due to the fact that making an ORC requires Type 2 processing, which is not induced by oral choice expression. If this assumption were true, the likelihood of making an ORC should be equal between manual and oral choice expression conditions if Type 2 processing is externally induced by a choice modality unrelated trigger. In other words, the modality of choice expression should not have an impact on the likelihood of making an ORC if Type 2 processing is externally triggered prior choice expression.

To test the assumption that manual choice expression is more likely to yield an ORC if rational processing is not already externally triggered, the 'marble choice experiment', similar to the experiment conducted by Inbar/Cone/Gilovich (2010) was executed. Thus, participants had to choose between one of two bowls of which one appears intuitively appealing (e.g., featuring more absolute winners) and the other constitutes an objectively rational choice (e.g., featuring a slightly higher winning chance). The rationale behind this experimental set-up is the RBP and it is assumed that choosing the bowl with less absolute but more relative winners constitutes the ORC and thus is a proxy for Type 2 processing.

The choice expression modality (i.e., manual versus oral choice condition) was manipulated and it was predicted that participants in the manual choice condition are more likely to opt for the ORC (e.g., bowl with more relative winners) compared to participants in the oral choice condition. As second manipulation, it was varied whether Type 2 processing was triggered by another independent external factor (e.g., fraction solving) prior choice expression or not. In line with the assumption that Type 2 processing is the underlying cause for making an ORC, it was assumed that the likelihood of making an ORC would not differ between choice expression modalities if Type 2 processing is triggered prior the actual choice.

3.7.1 Method

One-hundred-forty-eight students (41.2% Males, M_{Age} = 20.82 years, SD_{Age} = 1.02) participated in this two factor between subject design experiment in return for partial course credit. Participants were invited to come to the lab for individual sessions that were scheduled throughout two weeks and took place in the morning and afternoon (Monday to Friday, approximately from 9:00 am to 3:00 pm).

Immediately after their arrival, participants received an introduction sheet and were shown two bowls, containing two kinds of marbles (e.g., yellow and blue) on a table. They were told in the introduction sheet that the blue marbles are ‘winners’, while the yellow marbles are ‘losers’ and that the bowls would contain different amounts of marbles. Particularly, it was indicated that one bowl (Bowl A) would contain 100 marbles of which 91 would be yellow and 9 would be blue. The other bowl (Bowl B) would contain 10 marbles of which 9 would be yellow and 1 would be blue. The transparent bowls containing the marbles were clearly visible placed on a table in front of the participants and were labeled by small paper signs as ‘A’ or ‘B’ (see picture 2, General Appendix V).

Participants were instructed to decide from which bowl a research assistant should randomly draw a marble. They were informed that if he draws a blue marble they would win a prize (e.g., chocolate-bar), but if he draws a yellow marble they would not win anything.

It was manipulated whether the choice from which bowl the research assistant should randomly draw was expressed manually (i.e., manual choice condition, N = 74) or orally (i.e., oral choice condition, N = 74). While in the oral choice condition participants said their choice (e.g., ‘please pick from bowl A’ or ‘please pick from bowl B’) very similar to previous experiments, participants in the manual choice condition expressed their choice by pressing a button next to the bowl from which the research assistant should draw a marble. The manual modality ‘button pressing’ was applied to show that the effect is not due a difference between taking and speaking but rather due to a difference between manual versus oral choice expression. Further, because the choice expression modality ‘button pressing’ involves some interaction with the research assistant (e.g., participants have to make sure that the research assistant observes their action) and does not involve an explicit tangency of the choice object (e.g., participants were not allowed to touch one of the bowls or a marble), the set-up of Experiment 3 kept any possible influences of social interaction or the ‘mere touch’ constant across conditions.

As second manipulation half the participants were instructed to solve a small calculus task before choosing one of the bowls (‘high cognition’, N = 74). This calculus test was printed on one DIN A4 page and comprised five fractions for which participants were instructed to indicate the percentage value. Unknown to the participants, two fractions were actually a multiple of the winning odds of the two bowls. Solving fractions and indicating percentage values was assumed to trigger Type 2 processing (Attridge/Inglis 2015; DeWolf/Vosniadou

2015). To ensure that participants understood their task correctly, one example fraction (e.g., 13/39 = 33.33%) was provided. The fractions used are displayed in table 10 in the General Appendix V.

The other half of participants started immediately with the bowl choice ('Low cognition', N = 74). This procedure resulted in a total sample comprising four experimental groups ($N_{Manual/Low\ cognition}$ = 37, $N_{Oral/Low\ cognition}$ = 37, $N_{Manual/High\ cognition}$ = 37, $N_{Oral/High\ cognition}$ = 37). As stated before, choosing the small bowl is the ORC in this situation. Therefore, it was predicted that because only participants in the Oral/Low cognition condition are not triggered to engage in Type 2 processing, participants in this experimental group would be significantly less likely to make the ORC (i.e., choose the small bowl) compared to all other experimental groups. Because for the remaining three experimental groups (i.e., Manual/Low cognition, Manual/High cognition, and Oral/High cognition) it is assumed that Type 2 processing is triggered, no difference for choosing the small bowl among these conditions should be observable.

Eventually, as in Experiment 1 control measures for processing preference (e.g., NFC and FI) and intention to win (*'I tried to win'*) and knowledge of the RBP (*'I am familiar with the Ratio-Bias-Paradigm'*) assessed on a seven-point Likert scale (1 = strongly disagree, 7 = strongly agree) were included in the demographic section of the questionnaire.

3.7.2 Results RBP

To test the main hypothesis, the likelihood of participants choosing the small bowl (i.e., ORC) depending on their experimental condition was assessed first. As expected, when cognition was not externally triggered 54.1% of the participants expressing their choice manually chose the small bowl (i.e., Manual/Low cognition), but only 29.7% of the participants in the oral choice condition (i.e., Oral/Low cognition) choose the small bowl with fewer absolute winners, but relatively higher winning chances. This difference was statistically significant, χ^2 (1, N = 74) = 4.5, p = .034.

However, if participants had to solve the five fractions before choosing a bowl (e.g., High cognition), participants in the oral and manual choice expression condition were equally likely to choose the small bowl ($M_{Manual/High\ cognition}$ = 67.6% vs. $M_{Oral/High\ cognition}$ = 62.2%, χ^2 (1, N = 74) = .24, p = .63).

Further, within the manual choice condition there was no difference in the percentage of participants choosing the small bowl, regardless whether cognition was externally triggered or not ($M_{Manual/Low\ cognition}$ = 54.1% vs. $M_{Manual/High\ cognition}$ = 67.6%, χ^2 (1, N = 74) = 1.42, p = .23).

However, within the oral choice condition participants were significantly less likely to choose the small bowl when cognition was not externally triggered ($M_{Oral/Low\ cognition}$ = 29.7%) compared to when cognition was externally triggered ($M_{Oral/High\ cognition}$ = 62.2%, χ^2 (1, N = 74) = 7.84, p = .005). Figure 9 and Figure 10 provide visual representations of the results.

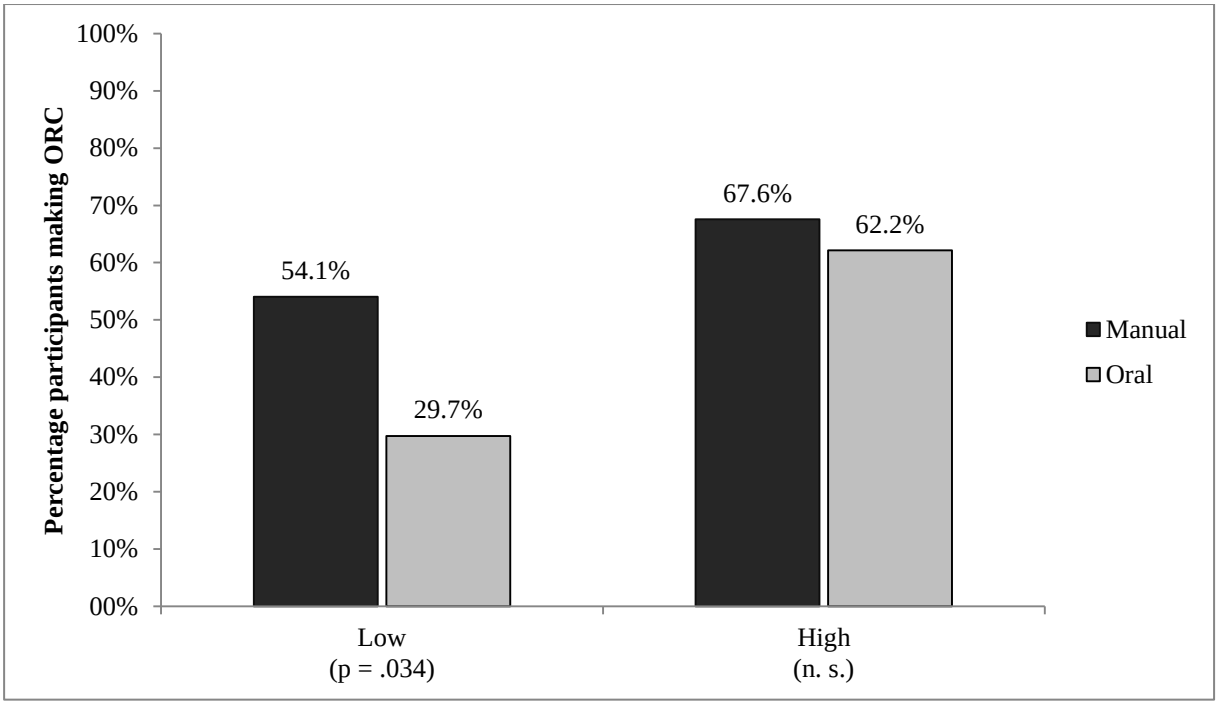

Figure 9: Percentage of participants choosing the small bowl (i.e., ORC) per experimental group I, Experiment 3, Study 1

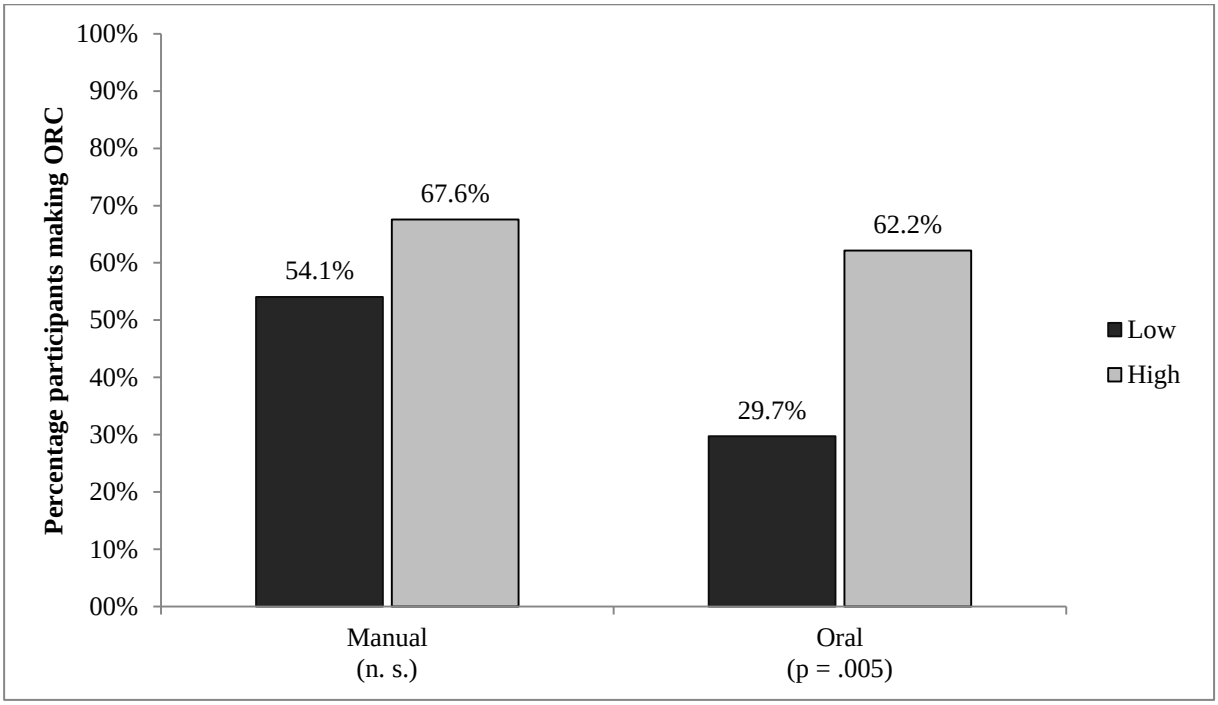

Figure 10: Percentage of participants choosing the small bowl (i.e., ORC) per experimental group II, Experiment 3, Study 1

As in the previous experiments, control variables were subsequently assessed. The NFC and FI were created following the same approach as outlined in Experiment 1. However, neither for the NFC ($F(3, 144) = .27$, $p = .85$) nor for FI ($F(3, 144) = .98$, $p = .4$) a significant difference between conditions could be revealed (see Figure 11 for a visual representation, black lines indicate standard errors of the means).

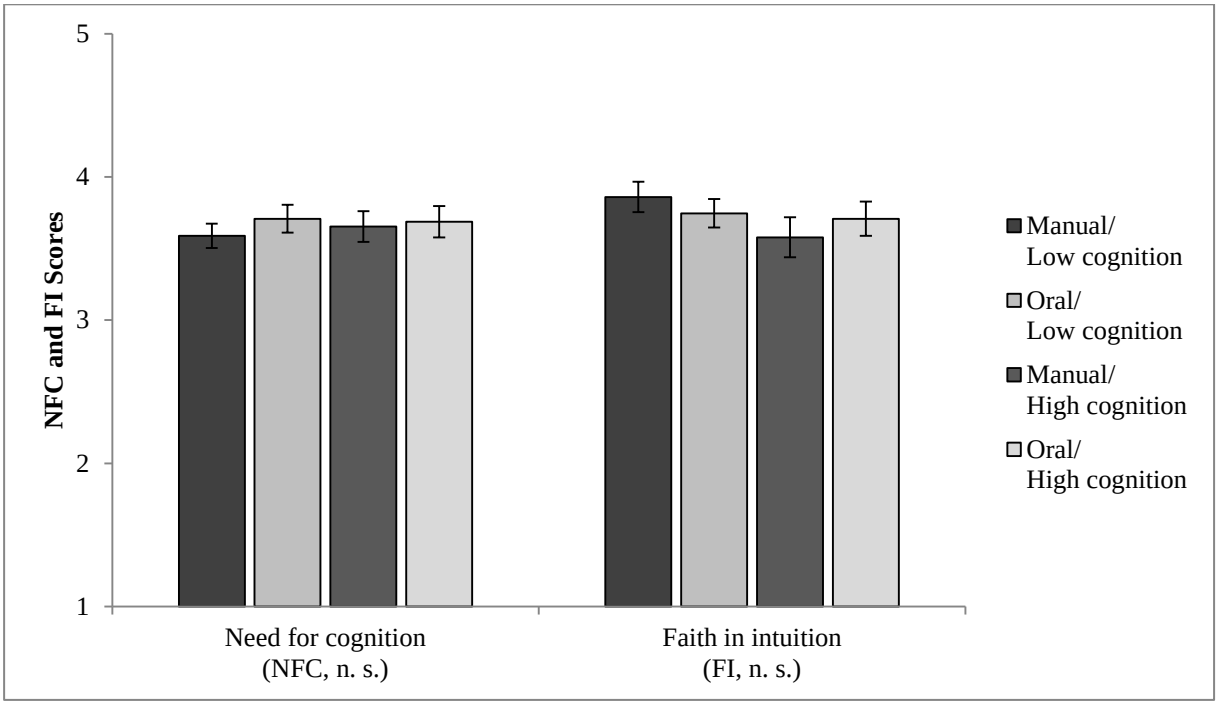

Figure 11: NFC and FI scores per experimental group, Experiment 3, Study 1

Further, the overall intention to win was fairly high among all participants (M_{Total} = 5.78, SD_{Total} = 1.44) but not significantly different among conditions (F(3, 144) = .3, p = .82). The overall RBP knowledge was considerably low among all participants (M_{Total} = 3.05, SD_{Total} = 1.8) and also not significantly different among conditions (F(3, 144) = .49, p = .69). Thus, there was no difference among conditions in the preference for Type 2 processing, pre-knowledge of the choice problem at hand (i.e., knowledge of the RBP), and the intention to actually win (and hence the motivation to make a good choice). These results are depicted in Figure 12 (black lines indicate standard errors of the means).

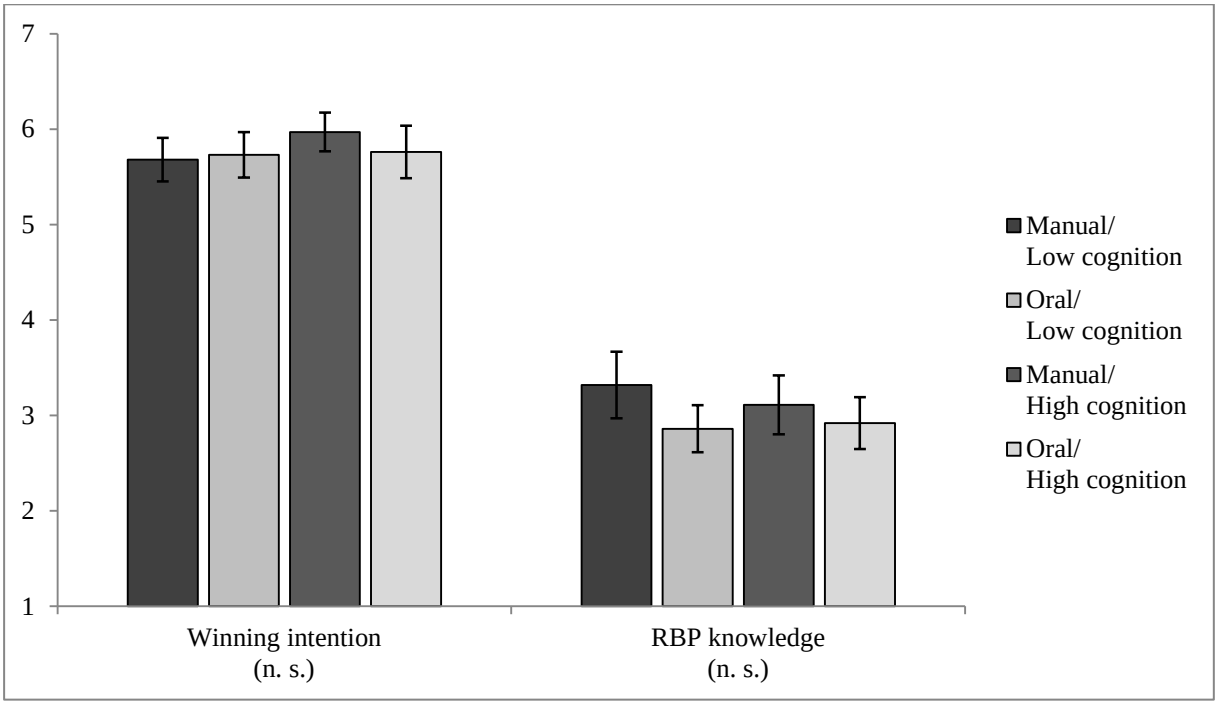

Figure 12: Winning intention and RBP knowledge per experimental group, Experiment 3, Study 1

Noteworthy to mention is that controlling for processing preference (i.e., NFC, FI), intention to win and RBP knowledge did not significantly affect the results. Detailed statistics can be found in the General Appendix XI.

3.7.3 Discussion Experiment 3

Experiment 3 adds to the previously conducted experiments in several essential ways. First, by replicating the main effect that manually expressed choices are more likely to yield an ORC compared to orally expressed choices in a different scenario (e.g., choosing a bowl with fewer absolute winners, but higher winning probability over a bowl with more absolute winners, but lower winning probability), robustness of the initial findings is provided. Second, Experiment 3 implies that the observed effect is unlikely caused by any artifact of the 'mere touch effect' or due to social interaction as these potentially influential factors are held constant in the present experiment. More precisely, in contrast to Experiment 1 and Experiment 2 (a, b), in Experiment 3 participants did not physically touch their choice as they did not take it and were not handed it. Further, all participants were obligated to interact to some extent with the research assistant. Finally and most important, Experiment 3 provides more explicit evidence for the underlying mechanism of the main effect. In particular, only

when Type 2 processing was not externally triggered it was observed that manual choice expression is more likely to yield an ORC compared to oral choice expression. However, when Type 2 is externally triggered unrelated to the choice expression modality there was no difference in the likelihood of making an ORC among participants in the oral and in the manual choice condition. Particularly, participants instructed to express their choice manually and who were not instructed to solve fractions (i.e., Manual/low) were as likely to choose the ORC as participants who were externally triggered to engage in Type 2 processing (i.e., Oral/high and Manual/high). This implies that manual choice expression and fraction solving induces similar mental processes (i.e., Type 2 processing).

3.8 General Discussion

Although nowadays consumers have the opportunity to express their decisions and choices through many different modalities in the marketplace, research on the impact of choice expression modalities is still scarce. Referring to dual processing theory, this research is a first attempt to investigate the impact of manual and oral choice expression modalities on choice rationality and types of mental processing. In three controlled laboratory experiments, first empirical evidence for the assumption that individuals expressing their choice manually are more likely to make an ORC than are individuals expressing their choice orally was obtained. Because making an ORC can be considered as proxy to assess Type 2 processing (Toplak/West/Stanovich 2011), these results imply that manual choice expression is an external antecedent of Type 2 processing. More specifically, in Experiment 1 it was observed that in a situation in which switching an initial choice is considered the ORC, participants expressing their initial choice manually were more likely to switch than were participants expressing their initial choice orally. Experiment 2 revealed that performance in the CRT and syllogism reasoning, which can be considered as proxies for Type 2 processing, was significantly increased when answers were provided manually rather than orally. Eventually, Experiment 3 showed an important boundary condition. If Type 2 processing was externally activated (i.e., by fraction solving), no significant difference in the likelihood of making an ORC between the modalities of choice expression could be observed. However, when Type 2 processing was not externally activated, the initial effect in line with the main hypothesis could be replicated. That is, participants expressing their choice manually were more likely to choose the ORC compared to participants expressing their choice orally. This finding is in

line with the assumption that choice rationality is a consequence of Type 2 processing and that only manual choice expression modalities constitutes an external antecedent of Type 2 processing. The results obtained in this study are essential for both theoretical and practical considerations.

3.8.1 Theoretical Implications

Dual processing theory is one of the most intensely studied fields in social psychology (Alter et al. 2007). Although this theory was repeatedly challenged (Keren 2013; Osman 2004), there is now much agreement regarding its basic concepts and assumptions. To this date ample studies have investigated the underlying mechanisms and consequences of two distinct types of cognitive processing, one that is fast, automatic, and intuitive (Type 1) and one that is slow, deliberated, and analytic (Type 2). However, research on the antecedents or external factors that might trigger the one or the other type of cognitive processing is still limited (Inbar/Cone/Gilovich 2010). In this research, it was proposed that the way or modality in which a choice is expressed (i.e., choice expression modality) might function as external antecedent of Type 2 processing. The underlying rational for this proposition was based on findings in the field of neuroscientific research, which imply that manual choice expression might trigger activity in brain areas involved in higher cognition. Since research in neuroscience implies that oral choice expression does not trigger brain activity in brain areas involved in higher cognition, one can deduce that individuals expressing a choice orally retain Type 1 processing. This assumption is in line with the 'default-interventionist theory' (e.g., Evans 2007), which assumes that choices are made based on Type 1 processing, unless Type 2 processing is triggered. Therefore, this study is directly related to recent attempts implying that Type 2 processing can be triggered by situational cues (Alter et al. 2007; Inbar/Cone/Gilovuch 2010). However, the present study differs from earlier studies as it additionally provides a first conceptual explanation of the underlying mechanism for the observed results (i.e., activity in different brain areas). Although it was possible to rule out some alternative explanations for the obtained findings (i.e., motivation or ability), the research design could only implicitly proof the presence of Type 2 processing. Even though the methods applied in this study follow the latest research recommendation, the implicit nature of these state of the art measures is an issue that should be considered by future studies and researches and should elicit the development of more direct methods to successfully

assess dual processing. Nevertheless, as the main purpose of the present study was to shed more light into the new research avenue of choice expression modalities, this research is theoretically as well as practically valuable as it implies that the mere fact, in which modality a certain choice is expressed, influences the likelihood of making an ORC.

3.8.2 Practical Implications

In every day's life individuals are surrounded by various options to express our decisions and choices (i.e., 'choice expression modality'). However, as there are few insights into whether the mere fact in which a choice is expressed might steer choices and decisions and potentially impact choice related variables, it seems that in reality practitioners underestimate the impact of the modality in which customers express their choices. It even appears that their consideration which choice expression modality to offer to customers is often not strategically grounded, but rather based on convenience or is simply randomly assigned. For example, many supermarkets offer two options to purchase groceries such as bread, cheese, or meat simultaneously. Customers can either take pre-packed items from a shelf themselves or they can go to a service counter and say which items they would like to have. The same is true for farmer's markets that in the course of the organic movement become increasingly popular. While some market stalls still offer their products in the traditional way (e.g., customers have to say what they want) some stalls offer the opportunity for customers to choose their vegetables themselves and pay their basket in the end. Eventually, the internet influenced shopping behavior tremendously and many purchase decisions are now entirely manually expressed (i.e., by clicking) which formerly included a great amount of oral choice expression. These examples illustrate that in reality most vendors seem to assume that the modality in which choices are expressed is virtually unimportant for the final decision or choice.

However, this study implies that the modality in which a choice is expressed has a direct influence on the likelihood of making an ORC. Considering that products can differ according to their relative vice and relative virtue features (Wertenbroch 1998), this fact might become interesting for practitioners. For instance, Raghunathan/Naylor/Hoyer (2006) found that healthy snacks trigger an intuitive and automatic perception of being not tasty, although when asked to think about these products thoroughly, individuals valued them for their healthy benefits. Other products appear intuitively appealing (e.g., salty snacks), but might lose some

of their subjective value if consumers deliberate about them (e.g., content of fat, calories). Thus, manufactures of products involving relatively more vices (i.e., indulging snacks or a gas guzzling sports car) might consider offering oral choice modalities to prevent thorough deliberation, while manufactures of products featuring relatively more virtues (i.e., healthy nutrition or a safe, but boring car), might consider to let their customers to express their choices manually, to induce deliberative thinking and overcome the intuitive perception of unattraction (e.g., Dhar/Wertenbroch 2000).

Further, whether a choice is based on impulsive and intuitive Type 1 or cognitive and reflective Type 2 processing might also impact customer's variety seeking. For instance, research implies that an impulsive decision style (i.e., Type 1 processing) is likely to enhance variety seeking (Baumgartner 2002; Sharma/Sivakumaran/Marshall 2010). While individuals processing information reflectively (i.e., Type 2 processing) often perceive a need to find reasons and to justify their choices (Jordan/Whitfield/Zeigler-Hill 2007; Strack/Deutsch 2004), which is easier for a choice from a relatively smaller assortment than for a choice from a relatively larger assortment (Scheibehenne/Greifeneder/Todd 2010). Thus, vendors offering large assortments might steer their customers to express their choices orally, while vendors with smaller assortments might consider offering manual choice expression modalities. Besides this direct impact of choice expression modalities on the objective rationality of choice, there might be an additional, but probably more indirect effect of choice expression modality on choice satisfaction. For example, Hafner/White/Handley (2012) argue that sticking to one's initially chosen envelope after one non-winning token is uncovered in the 'Monty Hall Game' is not necessarily a proxy for irrational behavior, but might be interpreted as 'revealed satisfaction'. Following this argumentation, one might alternatively interpret the finding of Experiment 1 that individuals expressing their envelope choice orally were less likely to change their initially chosen envelope, because they were more satisfied with their initial choice (i.e., 'choice-satisfaction' see Fassnacht/Schmidt/Pannek 2015; Heitmann/Lehmann/Herrmann 2007). This would imply that for certain choice situations an intuitive choice style (i.e., Type 1) might yield higher levels of choice satisfaction than a reflective choice style (i.e., Type 2). The examination of the impact of choice expression modalities on choice satisfaction will be the focus of Study 2 in Chapter 4 of this dissertation.

4 Study 2: The Effect of Oral and Manual Choice Expression Modalities on Choice Satisfaction

The following *Chapter 4* is presented in form of a scientific working paper. Although humans can use various modes to express their choices (e.g., by speaking, by physically taking, or by pushing a button etc.), so far no research has investigated whether the modality of choice expression influences subjective measures such as choice satisfaction. Study 2 *investigates the impact of choice expression modality on choice satisfaction*. In line with the assumption that in contrast to manual choice expression, oral choice expression does not induce Type 2 processing and the assumption that Type 2 processing impedes choice satisfaction in choice situations comprising uncertainty and little information, the present study shows that oral choice expression results in higher levels of choice satisfaction than manual choice expression (Experiment 1 (a, b) and Experiment 2). Moreover, in line with the assumption that this effect is due to a difference in mental processing, this study shows that the effect disappears if Type 2 processing is externally triggered prior choice expression (Experiment 3 and Experiment 4). Further, a moderated mediation analyses provides first evidence for the conjecture that the satisfaction augmenting effect of oral choice expression is mediated by intuition, but only if Type 2 processing is not externally triggered.

4.1 Introduction

We face many difficult decisions in choices in life that require detailed deliberation. Which job to take, which city to live in, or which car to buy constitute examples for important and complex decisions for which most people prefer decisions and choices based on reflective consideration (Dijksterhuis/Nordgren 2006; Gilblin/Morewedge/Norton 2013; Inbar/Cone/Gilovich 2010). However, we are frequently confronted with choice situations that comprise incomplete information and choice uncertainty, which impede detailed deliberation. Consider for instance an individual who has to choose between two seemingly identical assignments at work or a customer in a restaurant choosing between two exotic desserts, which both are new and unfamiliar to her. In these choice situations, which involve incomplete information and choice uncertainty, individuals simply have to follow their intuition and to make a decision following their ‘gut-feeling’ (e.g., Payne/Bettman/Johnson

1988). In fact, in these decision situations, intuition might even yield better and more satisfying choices compared to decisions based on reasoning. For instance, Hammond et al. (1987) found that in vague and uncertain situations, the performance and the decision quality of professionals is augmented when the decision style is intuitive. Similarly, Wilson et al. (1993) observed that individuals are more satisfied with a poster choice when they utter it immediately and spontaneously compared to when they deliberate about it.

Given that in situations of uncertainty, intuitive decisions might yield better choices compared to reason and deliberation based decisions, it is important to understand what prompts individuals to engage in intuitive decision making rather than extensive deliberation. Previous studies imply that the mere fact in which modality a choice is expressed might influence a final decision and choice (e.g., Klesse/Levav/Goukens 2015). Particularly, based on the 'dual processing theory' it was observed in Chapter 3 of the present dissertation that individuals expressing their choices orally are likely to maintain an intuitive and reflexive style of cognitive processing (i.e., Type 1 processing). In contrast, when choices are expressed manually it appears that individuals engage in a reflective and deliberative style of cognitive processing (i.e., Type 2 processing).

Consequently, it is stated that the mere act of expressing one's choice orally (versus manually) increases choice satisfaction in choice situations with limited information, uncertainty, and in which the outcome of a choice is a subjective matter (e.g., Inbar/Cone/Gilovich 2010). For this purpose, four experiments are designed to demonstrate that oral (e.g., speaking) versus manual (e.g., taking and button pressing) choice expression yields higher choice satisfaction (Experiment 1 (a, b), Experiment 2), but only if Type 2 processing is not externally triggered (Experiment 3, Experiment 4). In the following section a brief overview of the underlying concepts and definition of the most important constructs is provided. Based on this overview testable hypotheses are developed.

4.2 Conceptual Background

4.2.1 Dual Processing: A Brief Summary

In this study it is conjectured that orally expressed choices result in higher levels of choice satisfaction than manually expressed choices based on the assumption that oral and manual choice expression modalities induce different types of cognitive processing. More specifically, it is proposed that manual choice expression triggers a rational decision style (i.e., Type 2 processing) and oral choice expression triggers an intuitive decision style (i.e., Type 1 processing). Because of the extensive discussion on the link between choice expression modality and mental processing styles (i.e., dual processing), in chapter 3.2 of this present dissertation only the main pillars of this argumentation that clarify the important concepts for this study are briefly discussed and explained.

The 'dual processing theory' proclaims that information processing and decision elicitation is either based on reflexive intuition (i.e., Type 1 processing) or reflective deliberation (i.e., Type 2 processing) (e.g., Evans 2008). Further, the 'default-interventionist theory' implies that by default individuals decide and process according to Type 1 processing. Only if the decision or choice context requires further attention and cognition is externally induced, individuals engage in Type 2 processing (Evans 2007, 2008, 2011; Evans/Stanovich 2013; Wason/Evans 1975). Accordingly, in Study 2 it is assumed that Type 1 processing is the default mode and Type 2 processing can be triggered by external antecedents (e.g., Alter et al. 2007; Inbar/Cone/Gilovich 2010).

4.2.2 Choice Expression Modality and Intuitive Choices

Nowadays, individuals can express their choices by interacting with companies using various different mediums. In many stores consumers select items by simply taking them from the shelf. In some situations consumers can express their choices by button pressing (e.g., a vending machine), and sometimes consumers have to talk to another person to express their choice. Thus, depending on devices used or situational factors, consumers might express their choices orally (i.e., by speaking) or manually (e.g., by button pressing or by taking an item).

Based on the assumptions of Klesse/Levav/Goukens (2015), in chapter 3.1 of the present dissertation, it was conjectured that choice expression modality impacts the degree of decision

deliberation and eventually the degree of the objectively assessable rationality of a final choice (i.e., making an ORC). This proposition was based on neuroscientific findings, implying that manual actions trigger activity in brain areas related to higher cognition (i.e. dorsal/caudal part of the ACC) and that verbal utterances trigger activity in brain areas related to affection (i.e., rostral/ventral part of the ACC) (Bush/Luu/Posner 2000; Paus et al. 1993; Qiu et al. 2007).

In a nutshell, the extensive argumentation given in Chapter 3.2 can be summarized by stating that oral choice expression yields an intuitive (i.e., Type 1) and manual choice expression yields a cognitive (i.e., Type 2) style of choosing.

4.2.3 Intuitive Choice and Choice Satisfaction

Although intuitive decisions and choices constitute very common forms of consumer behavior, intuitive decisions and choices based on the gut are often implicitly and explicitly considered as being inferior in comparison with rational, deliberation-based decisions and choices (Rook/Fisher 1995; Shafir/Simonson/Tversky 1993; Simonson 1989; Steenkamp/Maydeu-Olivares 2015; Strack/Werth/Deutsch 2006). This presumption is grounded in the assertion that individuals tend to prefer decisions that are justifiable to others (Slovic 1975) and the traditional economic view, which implies that rational choices are generally more acceptable and defensible (Simon 1955).

However, although it is often inferred that thorough deliberation about a decision increases choice quality (e.g., Chaiken 1980), which in turn should increase the level of choice satisfaction (e.g., Fassnacht/Schmidt/Pannek 2015; Raiffa 1968; Tordesillas/Chaiken 1999), some studies imply that intuitive decision making might yield superior choices and result in greater choice satisfaction compared to reason based decision making depending on the choice context (Dijksterhuis et al. 2006; Novak/Hoffman 2009; Kahneman 2003).

Particularly, research repeatedly reveals that when objective decision and choice rules are not readily applicable due to context specific constraints, such as limited information and choice uncertainty, intuitively elicited decisions can outperform decisions based on reflective and thoroughly deliberation. For instance, Hammond et al. (1987) found that in vague and uncertain work situations, the performance and the decision quality of highway-engineers was

significantly enhanced when they relied on their intuition compared to when they attempted to decide analytically. Similarly, research in the field of management indicates that particularly for decisions characterized by information scarcity and uncertainty, managers' decisions often yield superior solutions and choices when they are based on intuitive rather than on reflective thinking (e.g., Dane/Pratt 2007; Hayashi 2001).

In the area of consumer research, Wilson/Schooler (1991) found that individuals were more likely to express choices in line with experts' opinions when they were instructed to decide spontaneously compared to when they were instructed to give reason for their decision. Further, Calvillo/Penaloza (2009) show that for simple choice scenarios intuitively expressed judgments can be better than judgments expressed after some deliberation. In their study, the authors provided participants with performance information about four fictional cars and asked them to subsequently judge the cars' performances. Performance information was designed so that one car was objectively superior (i.e., dominating), two cars were middle options, and one car was an option dominated by all other cars. Calvillo/Penaloza (2009) observed that participants who were instructed to express their judgment immediately after the display of performance information were more likely to detect the dominating pattern among the cars compared to participants who were instructed to consciously deliberate about the performance information or compared to those participants who were distracted prior judgment assertion (i.e., unconscious deliberation). Although the authors did not explicitly assess which car participants would prefer to choose, it is reasonable to assume that a more objective and correct assessment of the choice relevant factor 'car-performance' would likely impact choice and might eventually augment satisfaction with one's choice.

The assumption that an intuitive decision style augments choice satisfaction when the choice situation comprises only little information and the choice outcome is a subjective matter, is also supported by the research of Wilson et al. (1993). The authors showed participants a set of five posters and asked them to choose one of them as a present for participating in an unrelated study. One half of the participants was merely instructed to choose one of the posters, while the other half was additionally instructed to write down reasons for their choice. Wilson et al. (1993) observed that participants who choose immediately without being instructed to write down reasons were more satisfied with their choice (i.e., their poster) than were participants who were instructed to write down reasons for their choice. Dehghan et al. (2011) replicated the experimental set-up of Wilson et al. (1993) and obtained similar results.

They found that participants who were asked to choose one of the posters spontaneously (i.e., intuitively) were more satisfied with their chosen poster than were participants who were distracted by a filler task after initial poster exposure, but before expressing their final choice. Dehghan et al. (2011) explain this finding by arguing that the filler task triggered participants to 'unconsciously deliberate' (e.g., Dijksterhuis et al. 2006; Dijksterhuis/Nordgren 2006) about their decision. Consequently, these participants did not express an entirely intuitive final choice. This implies that even small or unconscious bits of rational deliberation can have a negative impact on choice satisfaction if the choice situation comprises little information, features a high level of choice uncertainty or when the choice outcome is a subjective matter.

In summary, it is conjectured that in choice situations comprising choice uncertainty and little information (e.g., when thoroughly deliberation is virtually impossible and an ORC is not traceable), an intuitive decision style (i.e., Type 1 processing) yields higher levels of choice satisfaction compared to a deliberation based decision style (i.e., Type 2 processing).

4.3 Hypothesis Development

Following the reasoning given above, it is suggested that in choice situations with little information and high levels of choice uncertainty, orally expressed choices result in higher levels of choice satisfaction than manually expressed choices. Accordingly:

H1: Oral choice expression (i.e., speaking) results in higher levels of choice satisfaction than manual choice expression (i.e., taking or button pressing).

In chapter 4.3, it was proposed that oral choice expression yields higher levels of choice satisfaction, because in contrast to manual choice expression, oral choice expression does not trigger a rational style of decision making (e.g., individuals remain in default Type 1 processing). Accordingly, it is assumed that if a rational style of decision making (i.e., Type 2) is triggered by an external factor (e.g., when individuals experience unexpected sensations or are triggered to pay attention) levels of choice satisfaction will not be affected by different choice expression modalities. Following this logic, the second hypothesis is formulated:

H2: Oral choice expression (i.e., speaking) only results in higher levels of choice satisfaction than manual choice expression (i.e., grabbing or button pressing), if Type 2 processing is not externally induced.

The aforementioned hypotheses imply that the effect of choice expression modality on choice satisfaction is mediated. More specifically the following moderated mediation effect is assumed:

H3: The effect of oral choice expression (i.e., speaking) resulting in higher levels of choice satisfaction than manual choice expression (i.e., grabbing or button pressing) is mediated by intuition, but only if Type 2 processing is not externally triggered.

4.4 Current Research

These three hypotheses are tested in four experiments. Specifically, Experiment 1 (a, b) and Experiment 2 are devoted to test that orally expressed choices result in greater choice satisfaction than manually expressed choices (H1) across different contexts. Experiments 3 and 4 are designed to test the second hypothesis as to whether orally expressed choices do not result in higher levels of choice satisfaction compared to manually expressed choices if Type 2 processing is triggered by altering the auditory feedback (Experiment 3) or by information disfluency (Experiment 4). Additionally, Experiment 4 provides initial evidence for the assumption that the choice satisfaction augmenting effect of oral choice expression is mediated by intuition, but only when Type 2 processing is not externally trigged (H3).

In all experiments, participants were asked to choose between two ostensibly similar options (e.g., drink A or drink B) while receiving only little information about the choice options (e.g., without knowing which option is which one). After making their choice, but before trying (i.e., inspecting, drinking or eating) their chosen option, participants are asked to indicate their satisfaction with the choice they made (i.e., choice satisfaction). Keeping all else constant, in each experiment it is manipulated whether participants make their choice orally (i.e., by speaking; ‘oral choice condition’) or manually (i.e., by taking the item of their choice or by pressing a button next to it; ‘manual choice condition’). The experimental set-up comprising a choice between ostensibly equal, but still distinct choice options, guarantees that

participants have to make a random choice with little information (e.g., Christenfeld 1995). As such, the choice situations can be considered as uncertain and choices are a subjective matter.

To provide evidence for the second hypothesis (H2), two field experiments (Experiments 3 and 4) were conducted in which, in addition to the general experimental set-up, the cognition and thus the type of mental processing of participants was manipulated (e.g., Type 2 processing was externally induced prior choice or not). In Experiment 3, Type 2 processing was triggered by manipulating whether participants could hear themselves in an altered or unaltered manner by means of music volume and active noise cancellation (i.e., auditory feedback). It is expect that altered auditory feedback activates Type 2 processing. In Experiment 4, Type 2 processing was induced by means of 'information disfluency'. Additionally, Experiment 4 tested the impact of the level of choice intuition on the effect of choice expression modalities on choice satisfaction (H3). Table 5 provides an overview of all experiments conducted in this Study 2.

#	Experiment	Purpose	Conditions
1 (a)	Paper Stack Experiment	H1: Choice Satisfaction	Oral (speaking) vs. Manual (taking)
1 (b)	Cola Experiment	H1: Choice Satisfaction	Oral (speaking) vs. Manual (taking)
2	Nougat Experiment	H1: Choice Satisfaction	Oral (speaking) vs. Manual (taking and button pressing)
3	Headphone/Cola Experiment	H1: Choice Satisfaction H2: External Cognition	Oral (speaking) vs. Manual (taking) X Regular vs. Altered Feedback
4	Cognition/Cola Experiment	H1: Choice Satisfaction H2: External Cognition H3: Moderated Mediation	Oral (speaking) vs. Manual (taking) X Fluent vs. Disfluent Information

Table 5: Overview of Experiments, Study 2

For all experiments, it was essential that participants followed all instructions closely and did not deviate to any extent. Particularly, participants who did not utilize the instructed choice expression modality (e.g., they grabbed their choice in the oral choice condition or were talking while taking their choice in the manual choice condition) or tried their chosen option before indicating their choice satisfaction were immediately excluded from the data set and never considered for any analysis. An overview of the excluded participants can be found in Table 6.

Experiment	Wrong Modality	Immediate/no Consumption	Total Exclusion
1 (a)	12	-	12
1 (b)	18	20	38
2	45	6	51
3	25	-	25
4	11	4	15

Table 6: Overview excluded participants per Experiment, Study 2

4.5 Experiment 1

Experiment 1 is subdivided into two independent Experiments 1 (a) and 1 (b). Both are intended to test the main prediction that expressing one's choice orally (e.g., by saying) results in higher levels of choice satisfaction than expressing one's choice manually (e.g., by taking) in different settings and with different choice options. In the laboratory Experiment 1 (a), individuals were asked to choose between two stacks of paper. In the field Experiment 1 (b), individuals were offered two ostensibly different drinks (i.e., different kinds of Cola) and asked to choose one of them. Due to this set-up, it is possible to test the effect of oral choice expression on choice satisfaction in different settings with different choice options and thus to provide proof of the robustness of the initial findings (e.g., Cumming 2014).

4.5.1 Experiment 1 (a) 'Paper Stack Experiment'

Participants were presented two stacks of paper, one labeled with the letter A and the other stack labeled with the letter B. They were told that each stack would constitute a different

experimental task, which they would have to work on in the course of their experimental session. Participants were instructed to choose one of the two stacks of paper, without receiving any further information about the experimental tasks or to which extent they would differ. Unknown to the participants, the choice expression modality was manipulated: half of the participants indicated their choice orally (i.e., by speaking 'oral choice condition') and the other half indicated their choice manually (i.e., by taking one stack 'manual choice condition').

4.5.1.1 *Method*

Experiment 1 (a) was a single factor between subject design laboratory study. The sample comprised eighty-two marketing students (Male = 43.9%, M_{Age} = 21.66, SD_{Age} = 1.86) who received partial course credit for their participation. Participants were invited to come to the lab for individual sessions that lasted approximately 12 minutes. Sessions were scheduled throughout one week and took place in the morning (Tuesday, Wednesday, Friday from 9:40 am to 1:30 pm) or in the afternoon (Monday and Friday, 12:40 pm to 4:30 pm). After arriving, but before entering the lab, participants were handed an introduction sheet, in which the procedure was explained. That is, they were informed that they would see two paper stacks placed next to each other on a table. The stacks were labeled with a different letter (i.e., one with an 'A', the other one with a 'B' (see picture 3, General Appendix VI)) and each stack would feature a different experimental task that participants would have to fulfill in order to receive the partial course credit. Participants were told that they have to choose one of the stacks without knowing which stack constitutes which task. No further information about the task was provided so that the choice situation can be characterized as uncertain and featuring little information. Unknown to the participants, it was manipulated whether participants were instructed to express their choice orally (i.e., by saying the letter of the stack (i.e., A or B) without touching it, N = 41) or manually (i.e., by taking the stack they want, without saying a word, N = 41). After reading the introduction sheet, participants were allowed to enter the lab. In the lab, a second research assistant was standing behind the table with the two stacks lying in front of her. Participants were allowed to choose as soon as they entered the lab. Participants who chose their stack orally said the letter (A or B) of their choice and were then handed their chosen stack. Participants who chose their stack manually took their preferred stack (A or B). Subsequently, all participants took a seat at separate table and received a one-

sided, paper based questionnaire before they were allowed to remove the cover sheet of their chosen stack and actually check the task they chose. In the questionnaire the participant's satisfaction with their choice (i.e., choice satisfaction) was assessed with three questions measured on a seven-point Likert scale (1 = I strongly disagree; 7 = I strongly agree): '*I am happy with my choice*', '*I am pleased with my choice*', '*I feel satisfied with my choice*' (e.g., Mano/Oliver 1993; Oliver 1989). Importantly, choice satisfaction was assessed before participants got to know anything about the task that they had chosen. After completion of this first questionnaire, participants were asked to start working on their chosen task. Unknown to the participants and regardless of their actual choice, all participants worked on exactly the same task (i.e., a word puzzle), which was actually just a filler task and not relevant for the present study. Participants worked on the puzzle for 7 minutes and were then provided a second questionnaire in which demographics were assessed. After that participants were thanked and dismissed.

4.5.1.2 *Results*

To assess choice satisfaction, the three choice satisfaction questions were computed into a composite measure 'choice satisfaction index' (in the following CS-Index), reaching sufficient reliability ($\alpha = .95$). In line with the first hypothesis, participants expressing their stack choice orally ($M_{Oral} = 5.67$, $SD_{Oral} = 1.28$) were more satisfied with their choice compared to participants expressing their stack choice manually ($M_{Manual} = 5.07$, $SD_{Manual} = 1.26$, $F(1, 80) = 4.6$, $p = .035$, Cohen's $d = .47$).

4.5.2 *Experiment 1 (b) 'Cola Experiment'*

Participants were presented two identical looking cups of Cola and it was claimed that one would contain national brand Cola (hereafter: NB Cola) and one would contain private label Cola (hereafter: PL Cola). Participants did not receive any further information about the cups and were only allowed to try one of them in the cause of the experiment. The choice expression modality was manipulated and it was examined whether oral choice expression modality (i.e., 'speaking') yields higher levels of choice satisfaction compared to a manual choice modality (i.e., 'taking').

4.5.2.1 *Method*

Experiment 1 (b) was conducted on campus on two consecutive days (Tuesday and Wednesday; from 9:30 am to approximately 2:00 pm) as single factor between subject design. All individuals walking by were invited to participate in exchange for a free cup of Cola. The sample comprised one-hundred-ninety-one individuals (Male = 45.5%, M_{Age} = 21.83 years, SD_{Age} = 3.19). Individuals were handed an introduction sheet in which the study procedure was explained. As a cover story, participants were told that they would participate in a tasting study and that they would have to decide for one out of two cups of Cola. They were informed that one cup would contain NB Cola while the other would contain PL Cola. In order to create a decision situation comprising uncertainty and little information, the cups looked identical and contained the exact same amount of Cola (100 ml). Moreover, it was not revealed which cup contained which type of Cola. Unknown to the participants, it was manipulated whether participants were instructed to express their choice orally (i.e., by saying the position of the cup 'left' or 'right' without touching the cup, 'oral choice condition' N = 96) or manually (i.e., by taking the cup they want, without saying a word, 'manual choice condition' N = 95). Because unknown to the participants both cups always contained the same NB Cola, participants always received the same Cola regardless of their actual choice. After reading the introduction sheet, participants were guided to a table on which the two cups of Cola were placed next to each other. The position of the cups was clearly marked by position signs indicating the position 'left' or 'right' (for experimental set-up see picture 4, General Appendix VII). After making their choice but before consuming the Cola (i.e., participants in the oral choice condition were handed their cup, while participants in the manual choice condition held their cup in their hand), all participants received a questionnaire.

After receiving, but before consuming their chosen Cola, participants were asked about their choice satisfaction with the CS-Index (i.e., similar to Experiment 1 (a)). Subsequently, participants were asked to taste their Cola and then to continue answering the remaining questions about their demographics. After that they were thanked and dismissed.

4.5.2.2 *Results*

As in Experiment 1 (a), choice satisfaction was assessed by computing the CS-Index, reaching sufficient reliability ($\alpha = .94$). In line with the first hypothesis (H1), participants expressing their choice orally ($M_{Oral} = 4.99$, $SD_{Oral} = 1.26$) were more satisfied with their choice compared to participants expressing their choice manually ($M_{Manual} = 4.31$, $SD_{Manual} = 1.37$, $F(1, 189) = 12.89$, $p < .0005$, Cohen's d = .52).

4.5.3 *Discussion Experiment 1*

The results of Experiment 1 (a) and Experiment 1 (b) suggest that individuals expressing their choice orally are more satisfied with their final choice than individuals expressing their choice manually in choice situations comprising uncertainty and little information (H1). Noteworthy are the facts that this effect appears prior actual knowledge of the attributes of the option individuals decided for (i.e., without knowing which task or which cola one actually chose) and that all individuals ended up with the same option regardless of their actual choice.

However, to provide more conclusive evidence for the argumentation that oral versus manual choice expression results in different levels of choice satisfaction, it is necessary to generalize the findings to another manual choice expression modality in the next experiment (i.e., button pressing). If a significant difference between speaking and both manual choice expression modalities (e.g., taking as well as button pressing) can be obtained, one can exclude the alternative explanation that the finding of Experiment 1 (a) and Experiment 1 (b) are specific to the comparison of speaking and taking.

4.6 Experiment 2 'Nougat Experiment'

As indicated before, Experiment 2 compares the impact of speaking (i.e., oral choice expression) to taking as well as button pressing (i.e., manual choice expression modalities) on choice satisfaction. In addition, to further generalize the initial findings, another product (i.e., nougat-cream) was utilized. Besides these adjustments, the procedure and conduction of Experiment 2 was similar to that of Experiment 1 (b).

4.6.1 Method

Experiment 2 was conducted on campus on two consecutive days (Tuesday and Wednesday, 9:30 am to 1:30 pm). All German-speaking individuals passing by were invited to participate in exchange for a free sampling of nougat-cream. The experimental sample comprised one-hundred-ninety individuals (Male = 51.9%, M_{Age} = 21.44 years, SD_{Age} = 2.78).[8]

All participants were handed an introduction sheet, which outlined the experimental procedure. Specifically, participants were informed that they would participate in a tasting study and had to decide between two samples of nougat-cream. As in Experiment 1 (b), participants were told that one sample would be a NB product (i.e., Nutella) and the other one would be the corresponding PL version. To create a choice situation comprising uncertainty and little information both samples looked identical (for experimental set-up see picture 5 and picture 6, General Appendix VIII). Further, participants were uninformed about which sample featured which type of nougat cream and were only allowed to try one of them. However, as in Experiment 1 (b), all participants received the same nougat cream, because all samples featured NB nougat cream. As experimental manipulations, participants were either instructed to say which sample they wanted ('oral choice condition', N = 64), to take one sample ('taking-manual choice condition', N = 63) or to press a button next to the sample they decided for ('button-manual choice condition', N = 63). Once participants made their choice (i.e., participants in the oral and button choice condition were handed their nougat sample, while participants in the taking choice condition held their sample in their hand), they received a questionnaire in which choice satisfaction prior to consumption and demographic information were assessed.

4.6.2 Results

As in previous experiments, the CS-Index was computed which reached sufficient internal reliability (α = .92). Given that choice expression modality was a three-level variable, orthogonal contrast codes were used to compare the (1) manual choice expression condition (i.e., taking *and* button pressing) to oral choice expression, (2) button choice expression to oral choice expression, (3) taking choice expression to oral choice expression and eventually (4) the two manual choice expression conditions to each other. Note that for the first three

[8] Data refer to 188 participants, as one participant refused to provide any demographic information.

contrasts significant results are expected, but that for the fourth contrast an insignificant result is predicted. Contrast coefficients and expected direction of effects are displayed in Table 7.

	Coefficient Speaking (S)	Coefficient Taking (T)	Coefficient Button (B)	Expected Effect
Contrast code 1: Speaking vs. Taking and Button	1	-.5	-.5	S > B&T
Contrast code 2 Speaking vs. Taking	1	-1	0	S > T
Contrast code 3: Speaking vs. Button	1	0	-1	S > B
Contrast code 4: Taking vs. Button	0	1	-1	T = B

Table 7: Contrast code coefficients and expected effects, Experiment 2, Study 2

The first planned contrast (1) revealed that participants who expressed their choice orally were more satisfied with their choice than participants who expressed their choice manually (M_{Oral} = 5.38, SD_{Oral} = 1.33 vs. M_{Manual} = 4.83, SD_{Manual} = 1.16, F(1, 187) = 8.61, p = .004, Cohan's d = .45). The second contrast (2) revealed a significant difference between oral choice expression and choice expression by taking (M_{Oral} = 5.38, SD_{Oral} = 1.33 vs. M_{Taking} = 4.73, SD_{Taking} = 1.21, F(1, 187) = 9.01, p = .003, Cohan's d = .49) and the third contrast (3) revealed a significant difference between oral choice expression and choice expression by button pressing (M_{Oral} = 5.38, SD_{Oral} = 1.33 vs M_{Button} = 4.93, SD_{Button} = 1.11, F(1, 187) = 4.3, p = .04, Cohan's d = .37). As predicted, the fourth contrast (4), which compares the two manual modalities to each other, was not significant, indicating that participants' choice satisfaction in these conditions did not differ (F(1, 187) = .86, p = .36, Cohan's d = .17). Since the Levene's test did not reject the hypothesis of homogeneity of variances (i.e., variance in the oral choice condition was significantly larger than in the button choice condition) the same analysis was conducted with adjusted degrees of freedom (DF) that do not assume equal variances. The results of this procedure do only marginally deviate from the previously reported results and can be found in Table 14 in the General Appendix XI.

A graphical representation of these results can be found in Figure 13 (black lines indicate standard errors of the means).

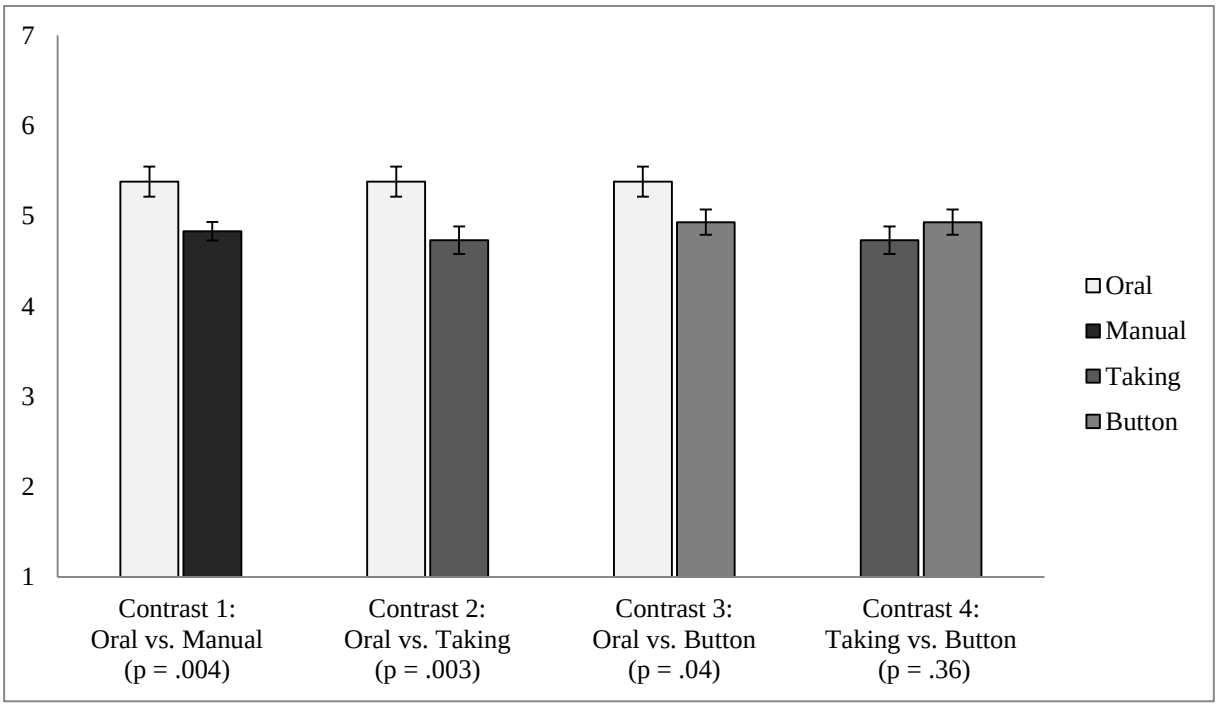

Figure 13: Choice satisfaction per experimental group, Experiment 2, Study 2

4.6.3 Discussion Experiment 2

Experiment 2 adds to the findings of Experiment 1 in two important ways. First, as a significant difference between speaking and both manual choice expression modalities (i.e., taking and button pressing) was revealed, it is reasonable to exclude the alternative explanation that the observed effect is inherent to the comparison of speaking and taking. Instead, the findings point toward a more fundamental difference between oral and manual choice expression in regard to choice satisfaction. Second, by replicating the findings of Experiment 1 (a) and Experiment 1 (b) utilizing an again different choice scenario (i.e., food rather than tasks or drinks) the robustness and potential of generalizability of the findings is further strengthened.

Figure 14 provides a comprehensive overview of the results of Experiment 1 (a), Experiment 1 (b) and Experiment 2, respectively (black lines indicate standard errors of the means).

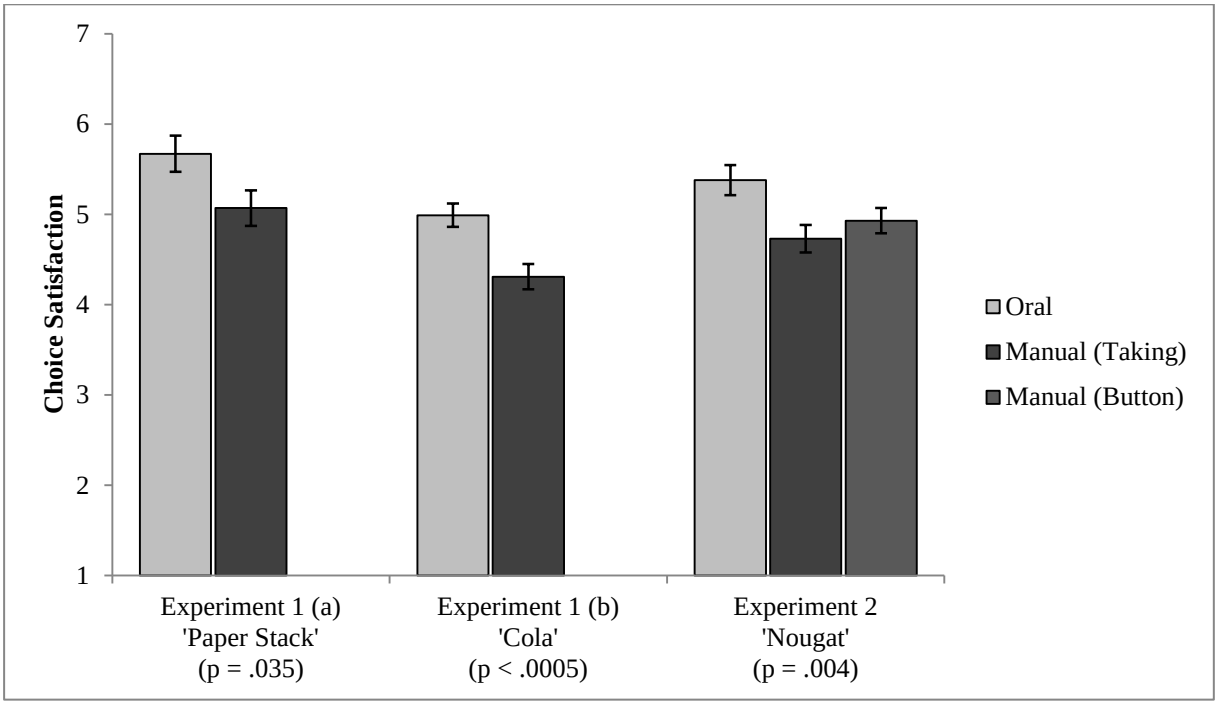

Figure 14: Choice satisfaction per experimental group, Experiment 1 (a, b), Experiment 2, Study 2

4.7 Experiment 3 'Headphone/Cola Experiment'

Experiment 3 fulfills the purpose to test the second hypothesis (H2) and thus to explore the underlying mechanism of the initial findings by highlighting an important boundary condition.

Recall that the reasoning for the choice satisfaction augmenting effect of oral choice expression is in line with the argumentation and findings of chapter 3 of the present dissertation. Based on findings in the field of neuroscientific research, indicating that Type 2 processing is related to brain activity in the dorsal/caudal part of the ACC (Bush/Luu/Posner 2000; Paus et al. 1993; Qiu et al. 2007), it was conjectured that in contrast to manual choice expression, oral choice expression does not function as an external antecedent of Type 2 processing. In other words, a lack of activity in the dorsal/caudal part of the ACC seems to be related to intuition based decision making (i.e., Type 1), which is assumed to be the cause for augmented choice satisfaction in choice situations comprising uncertainty and little information.

However, if this absence of Type 2 processing is indeed the underlying cause for the choice satisfaction augmenting effect, it is reasonable to assume that the level of choice satisfaction

should be equal among orally and manually expressed choices if Type 2 processing is externally triggered. Put differently, if brain activity in the dorsal/caudal part of the ACC was triggered prior choice expression, the level of choice satisfaction should be unaffected by the modality of choice expression.

Ample imagining studies repeatedly show that unexpected or conflicting sensations trigger activity in the dorsal/caudal part of the ACC (Carter et al. 1998; Holroyd et al. 2004; Paus 2001; Ridderinkhof et al. 2004). In particular, electroencephalography (EEG) studies further strengthen this link by showing that the absolute value of the event related negativity (ERN), a signal that likely evokes in the dorsal ACC (Holroyds/Cole 2002; Ridderinkhof et al. 2004), is increased by unexpected stimuli (Maidhof/Pitkäniemi/Tervaniemi 2013; Roth et al. 1976). This is important, because studies investigating auditory feedback induced brain activity find that if individuals hear their own voice in real time but in an altered manner (e.g., pitched or alienated), that the ERN is significantly augmented (Heinks-Maldonado et al. 2005; Heinks-Maldonado/Nagarajan/Houde 2006). In other words, one can deduce that hearing one's own voice in an unexpected and altered way triggers activity in the dorsal ACC.

Therefore, it is conjectured that altering the auditory feedback of one's own voice in an unexpected way triggers activity in the dorsal/caudal part of the ACC which in turn should induce Type 2 processing. As a result, the level of choice satisfaction between oral and manual choice expression should be equal, when the individuals hear their own voice in an altered and unexpected manner during choice expression.

In Experiment 3, it was consequently manipulated whether participants could hear their own voice unaltered or altered (by means of music volume and active noise cancellation) and it was predicted that oral choice expression only results in greater choice satisfaction than manual choice expression in choice situations comprising uncertainty and little information, if participants can hear their own voice unaltered. However, if the auditory feedback of one's own voice is altered, no difference in the level of choice satisfaction between conditions is expected.

4.7.1 Method

Experiment 3 utilizes a 2 by 2 between subject design in which the choice expression modality (i.e., oral versus manual) and auditory feedback (i.e., regular auditory feedback (RF)

versus altered auditory feedback (AF)) was manipulated. This flied experiment was conducted on three consecutive days (Monday till Wednesday from 10:00 am till 05:00 pm) on campus. All German-speaking individuals passing by were approached and invited to participate in a tasting study in exchange for a free cup of Cola. The sample comprised one-hundred-forty-three individuals (Male = 47.6 %, M_{Age} = 21.3 years, SD_{Age} = 2.54).

All participants were asked to choose one out of two cups of Cola following the same procedure outlined in Experiment 1 (b) (see picture 7, General Appendix IX). More precisely, although participants were told that one cup would contain PL and the other NB Cola and therefore faced a choice situation comprising uncertainty and little information, both cups actually contained 100ml of the same NB Cola. As manipulation, participants were either instructed to express their choice orally (by speaking, 'oral choice condition', N_{Oral} = 70) or manually (by taking, 'manual choice condition', N_{Manual} = 73). In addition to the procedure of Experiment 1 (b), in Experiment 3 participants were told that the effect of music on choice making was investigated. For this purpose, they were asked to wear active noise cancellation headphones[9] and listen to music (i.e., a variation of Händel's watermusic, which has been shown to be perceived as in exchange neutral in terms the mood impact (Mitterschiffthaler et al. 2007)) while expressing their choice. Unknown to the participants, the volume of the music was varied (i.e., low, ~32dB, or high, ~85dB) and the noise cancellation feature of the headphones was activated or disabled. More specific, for half of the participants (N_{RF} = 71), the music volume was low and the noise cancellation function was disabled (RF). For the other half (N_{AF} = 72), music volume was high and the noise cancellation function was activated (AF). This procedure yielded four experimental conditions ($N_{Oral/RF}$ = 35, $N_{Manual/RF}$ = 36, $N_{Oral/AF}$ = 35, $N_{Manual/AF}$ = 37).

As in the previous experiments, choice satisfaction (i.e., 'CS-Index') was assessed prior consumption of the chosen Cola. After that, participants were asked to taste their Cola and then to continue answering the remaining questions related to demographics and the auditory feedback manipulation. That is, participants were asked to which extent they agreed with the questions '*The music was very loud'* and '*The music made it impossible to hear myself speak'* on a seven-point Likert scale (1 = I strongly disagree to 7 = I strongly agree). Eventually, participants were thanked and dismissed.

[9] Bose Quiet Comfort 25 Acoustic Noise Cancelling Headphones, see picture 8, General Appendix IX.

4.7.2 Results

As in the previous experiments, choice satisfaction was assessed by computing the CS-Index, which reached sufficient reliability (α = .95).

Next, it was assessed whether the auditory manipulation worked as intended. Indeed, participants in the AF condition perceived the music as being louder (M_{AF} = 4.71, SD_{AF} = 1.66) than participants in the RF condition (M_{RF} = 2.18, SD_{RF} = 1.27, $F(1, 141) = 104.53$, $p < .0005$, Cohen's d = 1.7) and were also more likely to agree that the music made it impossible to hear themselves (M_{AF} = 4.93, SD_{AF} = 1.86) than were participants in the RF condition (M_{RF} = 2.69, SD_{RF} = 1.7, $F(1, 141) = 56.5$, $p < .0005$, Cohen's d = 1.26). For these questions, only a main effect of auditory feedback, but no interaction effect with choice expression modality was observed (p = .85, and p = .54, respectively). This implies that the auditory feedback manipulation worked as intended. The results of the manipulation check are displayed in Figure 15 (black lines indicate standard errors of the means).

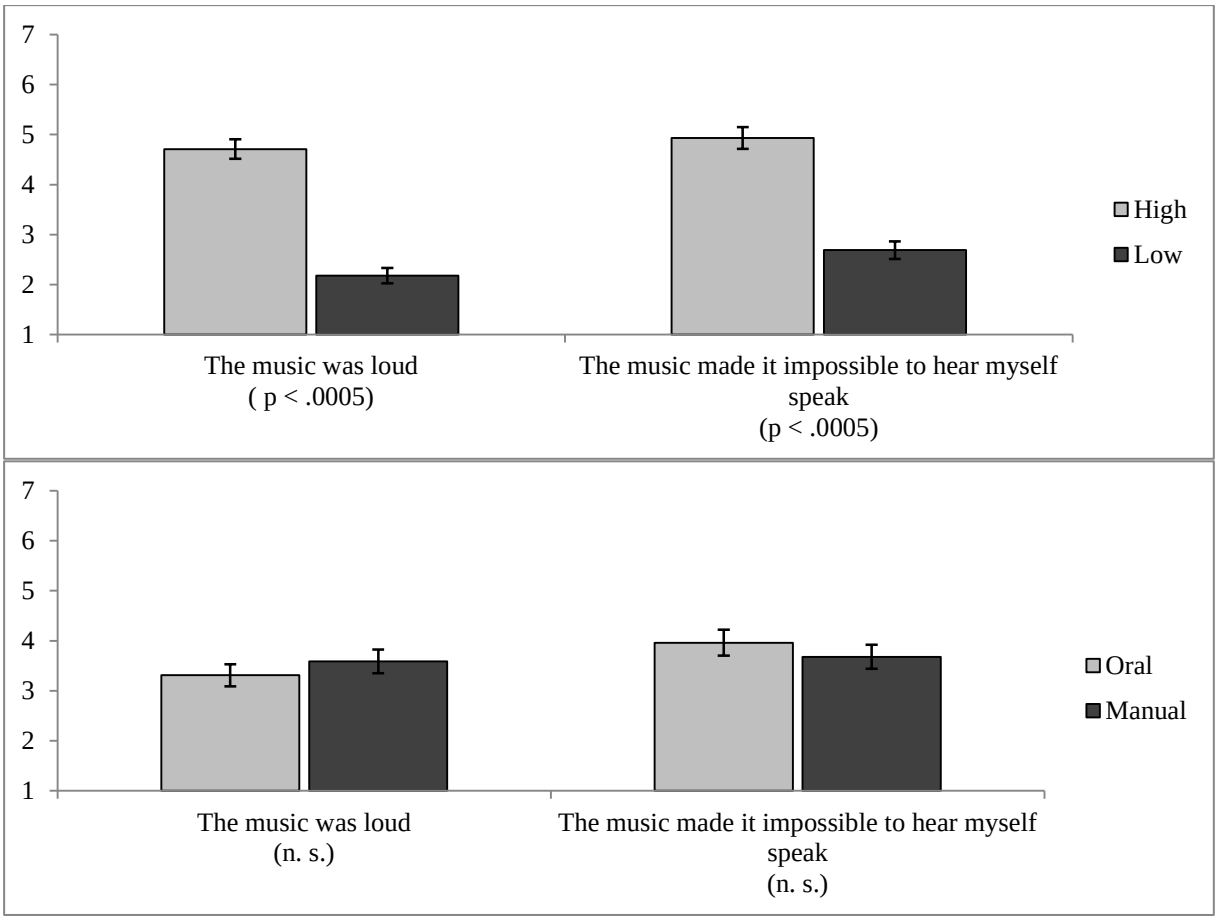

Figure 15: Manipulation check Experiment 3, Study 2

To access the hypothesized effect, the CS-Index was submitted to a two way ANOVA with choice expression modality (condition 1: 'Oral vs. Manual') and auditory feedback (condition 2: 'RF vs. AF') as independent factors. In line with the second hypothesis (H2), a significant interaction effect between condition 1 (e.g., oral vs. manual) and condition 2 (RF vs. AF) on choice satisfaction was obtained ($F(1, 139) = 3.89$, $p = .05$, $\eta^2 = .027$). In order to explore this interaction effect further, planned contrasts separately for the RF and AF condition were executed. As expected, within the RF condition the main effect in line with H1 was replicated. Participants expressing their cup choice orally ($M_{Oral/RF} = 5.59$, $SD_{Oral/RF} = 1.04$) were more satisfied with their choice than were participants expressing their choice manually ($M_{Manual/RF} = 4.76$, $SD_{Manual/RF} = 1.34$, $F(1, 69) = 8.52$, $p = .005$, Cohen's d = .69). However, within the AF no significant difference between orally and manually expressed choices was revealed ($M_{Oral/AF} = 5.00$, $SD_{Oral/AF} = 1.34$ vs. $M_{Manual/AF} = 5.01$, $SD_{Manual/AF} = 1.34$, $F(1, 70) = .001$, $p = .98$, Cohen's d = .007). This finding is in line with the second hypothesis (H2).

A graphical representation of the findings in Experiment 3 can be found in Figure 16 (black lines indicate standard errors of the means).

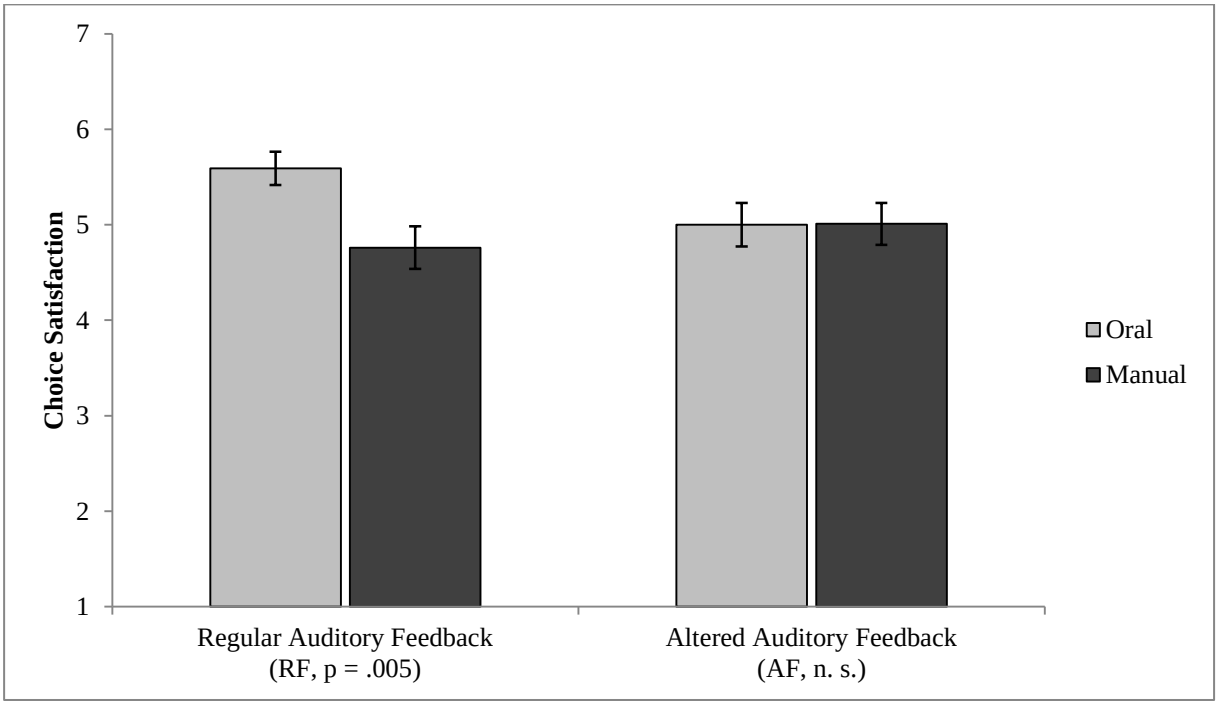

Figure 16: Choice satisfaction per experimental group, Experiment 3, Study 2

In order to demonstrate that oral choice expression augments satisfaction rather than that manual choice expression attenuates it, the CS-Index for RF and AF within the oral choice condition was compared. As expected, participants expressing their choice orally showed higher levels of choice satisfaction in the RF compared to the AF condition (p = .043, Cohen's d = .49). This implies that AF attenuates choice satisfaction.

4.7.3 Discussion Experiment 3

Experiment 3 was intended to show an important boundary condition and thus to shed light on the possible underlying mechanism for why oral choice expression yields higher levels of choice satisfaction. In line with the second hypothesis (H2), there was only a significant difference in the level of choice satisfaction between orally and manually expressed choices if participants could hear themselves in an unaltered manner and received regular auditory feedback (i.e., RF). However, in line with the assumption that altered auditory feedback triggers Type 2 processing, no significant difference in the level of choice satisfaction between orally and manually expressed choices was observable when participants received altered auditory feedback and heard their own voice altered in an unexpected manner (i.e., AF condition). In other words, the level of choice satisfaction was equal among conditions in which participants were expected to engage in Type 2 processing, but augmented when they were expected to remain Type 1 processing (i.e., Oral/RF condition).

Although these results provide initial evidence for the proposed mechanism, the findings are still rather implicit. First, although the results imply that the induction of Type 2 processing by altering auditory feedback was successful, this manipulation is so far unique and therefore requires further application to be considered as generally reliable. Further, although the results match all a priori expectations, the results only implicitly support the conjecture that the effect on choice satisfaction is actually caused by the existence or absence of a reflective processing mode (i.e., Type 2 processing). Accordingly, in the following Experiment 4 a more established method to experimentally trigger Type 2 processing is applied (i.e., disfluency). Additionally, Experiment 4 intends to measure the extent to which a choice is actually based on intuition or reflection more explicitly.

4.8 Experiment 4: 'Cognition/Cola Experiment'

Experiment 4 fulfills two main purposes. First, by manipulating Type 2 processing with a more established manipulation (e.g., information disfluency), it is intended to confirm the initial findings of Experiment 3 and thus, provide robustness of the results. Second, by explicitly measuring the extent of intuition versus reflection involved in choice expression, a more direct support for the underlying mechanism shall be provided. Hence, Experiment 4 is ought to test the hypothesis that the choice satisfaction augmenting effect of oral choice expression in choice situations comprising uncertainty and limited information is mediated by the level intuition, but only if Type processing 2 is not externally triggered (H3).

4.8.1 Manipulating Type 2 Processing by Means of Disfluency

Various studies have repeatedly shown that merely altering the font and therefore the fluency in which experimental information is provided changes the extent to which cognition and thus Type 2 processing is triggered (e.g., Alter/Oppenheimer 2009; Diemand-Yauman/Oppenheimer/Vaughan 2011; Gervais/Norenzayan 2012; Song/Schwarz 2008a). For instance, Alter et al. (2007) found that experiencing disfluency augments performance in cognitive demanding tasks, such as the CRT or syllogism reasoning. Moreover, in the context of intuitive choice situations, there is evidence that individuals are more likely to display attenuated levels of choice confidence or might even defer choice if information relevant to decisions is provided in a disfluent manner (e.g., Novemsky et al. 2007; Simmons/Nelson 2006). Although varying the difficulty of font is a widely accepted method to experimentally manipulate disfluency and eventually to induce a cognitive decision style (Alter/Oppenheimer 2009), there is dissent about which fonts are considered to be 'easy-' or 'difficult-' to-read.

4.8.1.1 *Pretest Easy- and Difficult-to-Read Fonts*

In a first step, different sources in which font disfluency manipulation were applied and in which detailed information about the execution was provided (e.g., which fonts were applied) were compiled. In total, it was possible to identify 13 different difficult-to-read and 3 easy-to-read fonts (see Table 8).

Font	Authors	Example
Arial, 10p, 25%, grey, italic	Alter/Oppenheimer (2008)	*Switzerland is famous for cuckoo clocks, banks, and pocket knives*
Arial, 12p *NORMAL FONT*	Alter/Oppenheimer (2009); Oppenheimer/Frank (2008); Song/Schwarz (2008a); Song/Schwarz (2008b)	Switzerland is famous for cuckoo clocks, banks, and pocket knives
Blackadder ITC, 12p, 50% grey, italic	Oppenheimer/Frank (2008)	*Switzerland is famous for cuckoo clocks, banks, and pocket knives*
Bondoni, 12p, 60% grey, italic	Diemand-Yauman/Oppenheimer/Vaughan (2011)	*Switzerland is famous for cuckoo clocks, banks, and pocket knives.*
Brush, 12p	Song/Schwarz (2008a); Song/Schwarz (2008b)	Switzerland is famous for cuckoo clocks, banks, and pocket knives
Comic Sans, 12p, 60% grey, italic	Diemand-Yauman/Oppenheimer/Vaughan (2011)	Switzerland is famous for cuckoo clocks, banks, and pocket knives.
Haettenschweiler, 12p, italic	Alter/Oppenheimer (2008)	***Switzerland is famous for cuckoo clocks, banks, and pocket knives***
Haettenschweiler, 12p	Diemand-Yauman/Oppenheimer,/ Vaughan (2011)	**Switzerland is famous for cuckoo clocks, banks, and pocket knives**
Haettenschweiler, 10p, 25% grey	Simmons/Nelson (2006)	Switzerland is famous for cuckoo clocks, banks, and pocket knives.
Mistral, 10p	Oppenheimer/Frank (2008)	Switzerland is famous for cuckoo clocks, banks, and pocket knives
Mistral, 12p	Song/Schwarz (2008a)	Switzerland is famous for cuckoo clocks, banks, and pocket knives
Monotype Corsiva, 12p	Diemand-Yauman/Oppenheimer/Vaughan (2011)	*Switzerland is famous for cuckoo clocks, banks, and pocket knives*
Tahoma, 9p *NORMAL FONT*	Simmons/Nelson (2006)	Switzerland is famous for cuckoo clocks, banks, and pocket knives
Times New Roman, 12p *NORMAL FONT*	Alter/Oppenheimer (2008); Alter/Oppenheimer (2009); Oppenheimer/Frank (2008)	Switzerland is famous for cuckoo clocks, banks, and pocket knives

Table 8: Overview fonts in alphabetic order, Pretest Experiment 4, Study 2

4.8.1.2 *Method*

To identify the 'easiest' and 'most difficult' font, a second step comprised an online pretest in which participants (N = 31, M_{Age} = 25.87 years, SD_{Age} = 2.94, 38.7% Male; M = 8.68, SD = .98 on a 1-10, 10 = 'Proficient English' scale) were displayed the sentence *'Switzerland is famous for cuckoo clocks, banks, and pocket knives'* and asked to indicate the ease with which they could read the sentence on a 7 point Likert scale (1 = very difficult to 7 = very easy; see Song/Schwarz (2008a) for a similar approach). The sequence of font appearance was randomized to prevent any influence of order on the results. Further, to insure that participants actually read the sentence in every font thoroughly, the question '*The spelling is correct*' on a 7 point Likert scale (1 = strongly disagree to 7 = I strongly agree) was included to induce the feeling that sentences might differ and thus to keep up the motivation to read all fonts carefully.

4.8.1.3 *Results*

To assess the results, a paired sample t-test was conducted. The results indicate that 'Times New Roman 12p' was rated the easiest-to-read font (M = 6.52, SD = .81) and that 'Mistral 10p' was rated the most difficult-to-read font (M = 2.61, SD = 1.43, $t(30) = 12.23$, $p < .0005$). Interestingly, although the sentence *'Switzerland is famous for cuckoo clocks, banks, and pocket knives'* was identical for all font manipulations, participants were more likely to indicate that the sentence might include a spelling mistakes when it was displayed in 'Mistral 10p' (M = 5.00, SD = 1.39) compared to when it was displayed in 'Times New Roman 12p' (M = 5.65, SD = 1.38, $t(30) = 12.23$, $p < .0005$).

Based on these results, 'Times New Roman 12p' was applied as easy-to-read font and 'Mistral 10p' as difficult-to-read font. It is predicted that 'Mistral 10p' font induces disfluency and therefore Type 2 processing.[10]

[10] By coincidence this manipulation matches the manipulation by Oppenheimer/Frank (2008) and 'Times new Roman 12p' was applied in all previous experiments of Study 2.

4.8.2 Method

Experiment 4 was conducted as a 2 by 2 between subject design, but was otherwise a replication of Experiment 1 (b). The experiment took place on campus on three consecutive days (Monday to Wednesday; from 10:00 am to approximately 3:00 pm) and all German-speaking individuals walking by were asked to participate in exchange for a free cup of Cola. The sample comprised two hundred individuals (Male = 50.5%, M_{Age} = 21.7 years, SD_{Age} = 2.48). [11] The cover story and the experimental set-up was generally a replication of Experiment 1 (b) (e.g., choice situation comprised uncertainty and little information). Half of the participants was instructed to express their cup choice orally (i.e., by saying the position of the cup 'left' or 'right' without touching the cup, 'oral choice condition', N_{Oral} = 100) while the other half was instructed to express their cup choice manually (i.e., by taking the cup they want, 'manual choice condition', N_{Manual} = 100).

In addition, the cognitive decision style by altering the fluency of the font of the instruction sheets was manipulated. As outlined before, it was expected that a difficult-to-read font triggers Type 2 processing (i.e., high cognition) and that an easy-to-read font does not trigger Type 2 processing and that thus individuals retain default Type 1 processing (i.e., low cognition). In particular, half the participants received the instructions in difficult-to-read 'Mistral 10p' font (N_{High} = 100), while the other half received an introduction sheet printed in easy-to-read 'Times New Roman 12p' font (N_{Low} = 100). Accordingly, this procedure created four experimental groups ($N_{Oral/Low}$ = 50, $N_{Manual/Low}$ = 50, $N_{Oral/High}$ = 50, $N_{Manual/High}$ = 50).

As in Experiment 1 (b), after reading the introduction sheet, participants were guided to a table on which the two cups of Cola were placed next to each other (i.e., the cup position was clearly marked by position signs 'left' or 'right' and every cup contained 100ml of the same NB Cola (see picture 9, General Appendix X)). After expressing their choice (i.e., participants in the oral condition were handed their cup, while participants in the manual condition held their chosen cup in their hand), but before drinking all participants received a questionnaire.

After receiving, but before drinking their chosen Cola, choice satisfaction was assessed with the CS-Index (see previous experiments). Further, it was assessed whether participants made their cup choice based on intuition or on thoughts. More specific, before participants were allowed to taste their chosen cup they were asked to indicate whether their choice was based

[11] One participant refused to indicate information about her age.

on their 'Intuition' or their 'Thoughts' by crossing a 10 cm long 'intuition-line' ('Intuition' = left side of the line, 'Thoughts' = right side of the line). Figure 17 provides a visual representation of the intuition-line.

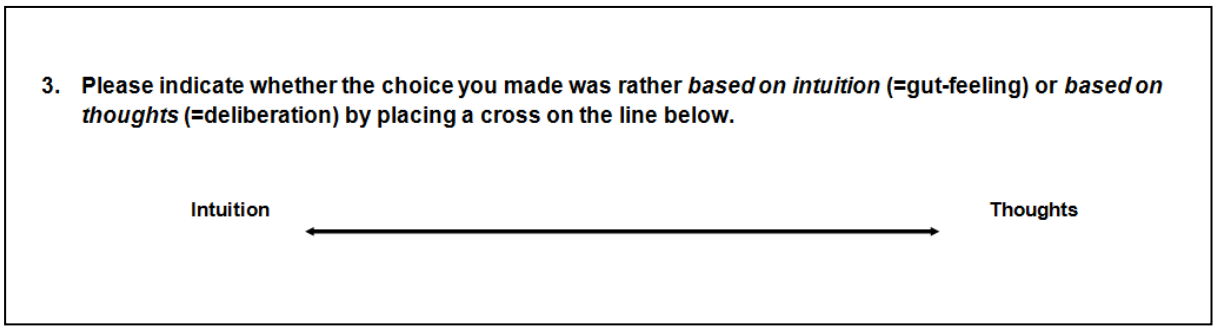

Figure 17: Depiction of the 'intuition-line', Experiment 4, Study 2

Subsequently, participants tasted their Cola and continued answering the remaining questions including demographics information and questions about the ease of reading the introduction sheet (e.g., manipulation check). For this purpose, participants were asked to rate the ease with which they could read the intro-sheet on a 7 point Likert scale (1 = very difficult to 7 = very easy; Song/Schwarz 2008a). After completion, they were thanked and dismissed.

4.8.3 Results

As in the previous experiments, the CS-Index reaching sufficient reliability (α = .94) was computed first.

Next, it was assessed whether the disfluency manipulation worked as intended. As expected, participants reading the introduction sheet in easy-to-read 'Times New Roman 12p' font perceived it as easier to read (M_{Low} = 6.16, SD_{Low} = 1.09) than did participants reading the introduction sheet in difficult-to-read 'Mistral 10p' (M_{High} = 3.3, SD_{High} = 1.8, $F(1, 198)$ = 183.03, $p < .0005$). The interaction effect between choice expression modality and disfluency manipulation was insignificant (p = .4). This implies that the 'cognition' manipulation worked as intended and that Type 2 processing was triggered (visual representation of the result can be found in Figure 18, black lines indicate standard errors of the means. For a similar manipulation check, see Alter et al. 2007; Novemsky et al. 2007; Song/Schwarz 2008b).

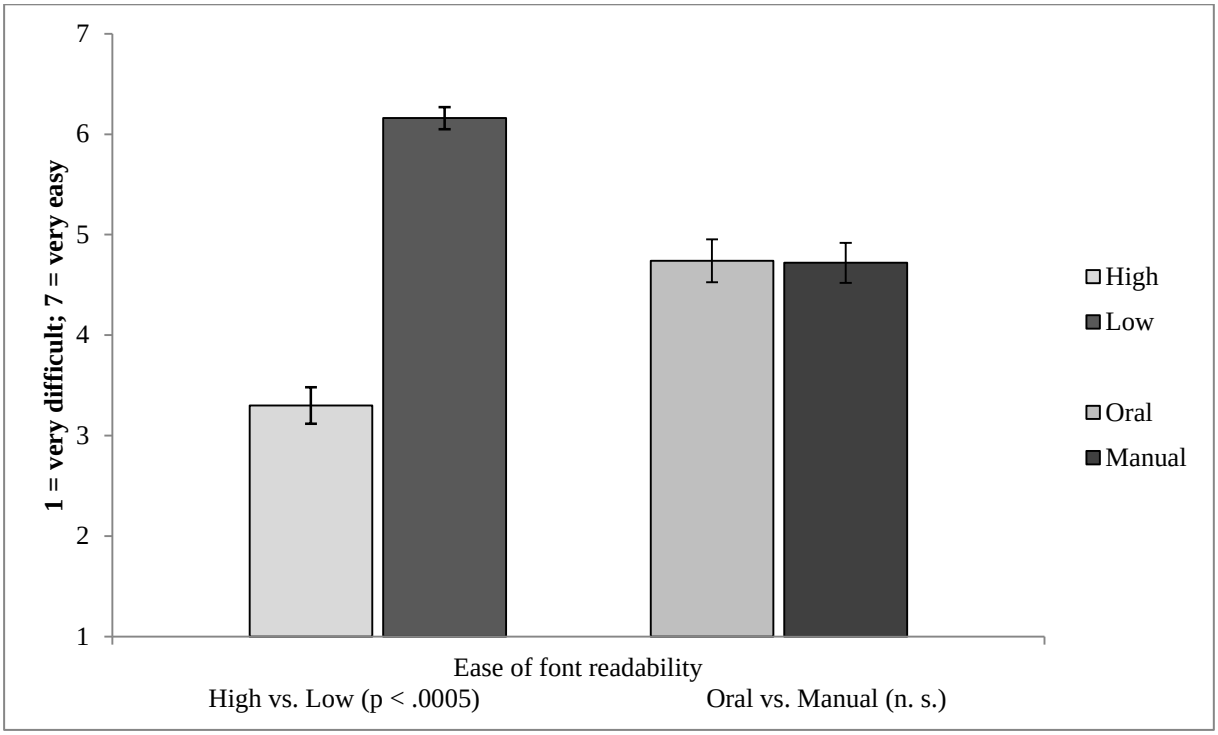

Figure 18: Manipulation check, Experiment 4, Study 2

To access the hypothesized effect, the CS-Index was submitted to a two way ANOVA with choice expression modality (condition 1: 'Oral vs. Manual') and cognition (condition 2: 'Low vs. High') as independent factors. This procedure revealed a significant interaction effect (F(1, 196) = 5.03, p = .026, η^2 = .025). Planned contrasts reveal a significant difference in the level of choice satisfaction between choice expression modalities when the font was easy-to-read and thus cognition was low ($M_{Oral/low}$ = 5.1, $SD_{Oral/Low}$ = 1.07 > $M_{Manual/Low}$ = 4.35, $SD_{Manual/Low}$ = 1.3, F(1, 98) = 9.84, p = .002, Cohan's d = .63) in line with the first hypothesis (H1). However, in line with the second hypothesis (H2) there was no difference in the level of choice satisfaction between the modalities of choice expression, when the font was difficult-to-read and thus cognition was high ($M_{Oral/High}$ = 4.65, $SD_{Oral/High}$ = 1.55 vs. $M_{Manual/High}$ = 4.71, $SD_{Manual/High}$ = 1.1, F(1, 98) = .05, p = .82, Cohan's d = .04). A graphical representation of the results is provided in Figure 19 (black lines indicate standard errors of the means).

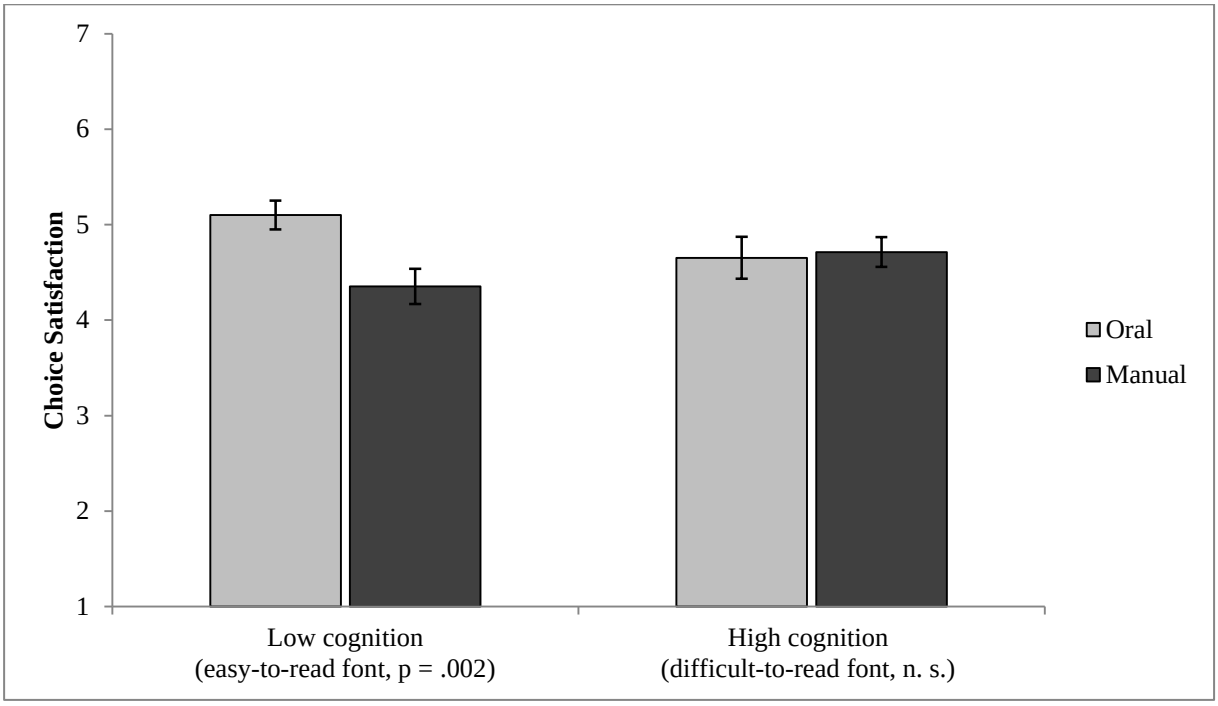

Figure 19: Choice satisfaction per experimental group, Experiment 4, Study 2

As a first step to access the third hypothesis (H3), the 'intuition-line' was reversed-scaled into an 'intuition-score' for which higher scores indicate higher levels intuition in choice making (e.g., a ten would indicate that the choice was entirely based on intuition and zero would indicate that the choice was entirely based on reasoning). In the next step, this 'intuition-score' was submitted to a two way ANOVA with choice expression modality (condition 1: 'Oral vs. Manual') and cognition (condition 2: 'Low vs. High') as independent factors. A marginally significant interaction effect was obtained (p = .06). As expected, within the high cognition condition 'intuition-scores' did not differ between choice expression modalities ($M_{Oral/High}$ = 7.88, $SD_{Oral/High}$ = 2.57 vs. $M_{Manual/High}$ = 8.17, $SD_{Manual/High}$ = 2.18, F(1, 98) = .38, p = .54, Cohan's d = .12*).* However, within the low cognition condition it was found that participants who expressed their choice orally indicated significantly higher scores on the intuition line ($M_{Oral/Low}$ = 8.25, $SD_{Oral/Low}$ = 2.49) than did participants who expressed their choice manually ($M_{Manual/Low}$ = 7.18, $SD_{Manual/Low}$ = 2.81, F(1, 98) = 4.06, p = . 047, Cohen's d = .4).

Eventually, to directly address the third hypothesis (H3) a moderated mediation analysis with CS-Index as dependent variable, condition 1 (Coding: Oral = 1; Manual = 0) as independent variable, intuition-score as mediator and condition 2 (Coding: Low = 1; High = 0) as binary moderator was conducted following the recommendations of Hayes (2012) and applying the

SPSS Macro ‘PROCESS’. Following the recommendations of Zhao/Lynch/Chen (2010) it was assumed that if the 95% bootstrapped (BS), bias-corrected (BC) confidence interval (CI) of the indirect effect excludes zero, a significant mediation effect is apparent. By observing the indirect effect of highest order, it was revealed that the interaction effect of condition 1 and condition 2 on the CS-Index is indeed mediated by the ‘intuition-score’ (a x b = .087, 95% BS, BC, CI = [.0015; .28]). Particularly, the assessment of the conditional indirect effects show that when cognition was low, the effect of oral choice modality was significantly mediated by the intuition score (a x b = .068, 95% BS BC CI = [.0012; .21]), but was not significantly mediated when cognition was high (a x b = -.019, 95% BS, BC, CI = [-.12: .03]). This finding supports the third hypothesis (H3).

4.8.4 Discussion Experiment 4

Experiment 4 fulfilled several purposes. First, within the low cognition condition, the results are an exact replication of the results obtained in Experiment 1 (b), because by coincident the font of the introduction sheets was identical (i.e., easy-to-read ‘Times New Roman 12p’ font). In line with the first hypothesis, it was revealed that participants expressing their choice orally indicated significantly higher levels of choice satisfaction than did participants expressing their choice manually. Second, by externally inducing Type 2 processing by means of information disfluency (i.e., font readability), the results provide further support for the second hypothesis and proof robustness of the findings of Experiment 3. In other words, comparable to Experiment 3, it was observed that the choice satisfaction augmenting effect of oral choice expression disappears if Type 2 processing is externally triggered prior choice expression. Finally, by conducting a moderated mediation analysis, it was possible to provide first explicit evidence for the assumption that the choice satisfaction augmenting effect of oral choice expression on the CS-Index is mediated by intuition, when cognition is not externally triggered. These results are in support for the third hypothesis (H3).

4.9 General Discussion

In Study 2, the impact of oral versus manual choice expression modalities on choice satisfaction in choice situations comprising uncertainty and little information was investigated. In line with dual processing theory (e.g., Evans/Stanovich 2013a) and evidence

from neuroscience (Bush/Luu/Posner 2000; Paus et al. 1993), it was conjectured that manual choice expression triggers Type 2 processing, while oral choice expression does not trigger Type 2 processing. Consequently, it was assumed that individuals expressing their choice orally retain default Type 1 processing (e.g., Evans 2007). Because research implies that an intuitive processing mode augments choice satisfaction in situations comprising uncertain and little information compared to a rational processing mode (Dijksterhuis et al. 2006; Wilson et al. 1993), it was conjectured that in these choice situations oral choice expression would yield higher levels of choice satisfaction compared to manual choice expression (H1). Further, because it was conjectured that the absence of Type 2 processing is the underlying cause for the choice satisfaction increasing effect, it was consequently proposed that there should be no difference in the level of choice satisfaction between orally and manually expressed choices if Type 2 processing is externally triggered (H2). Accordingly, it was further assumed that the choice satisfaction increasing effect is mediated by the level of intuition, when Type 1 processing is retained (H3).

Evidence for these conjectures was obtained in four experiments. By varying the choice options (i.e., paper based tasks, drinks and foods) and applying different forms of manual choice modalities (e.g., taking and button pressing), Study 2 provides evidence that oral choice expression yields higher levels of satisfaction compared to manual choice expression in different choice situations comprising uncertainty and little information (H1). It is therefore reasonable to argue that the obtained effect can be generalized to other choice situations that comprise uncertainty and little information.

In line with the supposition that the choice satisfaction augmenting effect is due to the absence of Type 2 processing when choices are expressed orally (H2), Experiment 3 and Experiment 4 show, that indeed no significant difference in the level of choice satisfaction between oral and manual choice expression modalities can be detected when Type 2 processing is externally triggered by means of altered auditory feedback (Experiment 3) or information disfluency (Experiment 4). Eventually, by applying a moderated mediation analyses (e.g., Hayes 2012), the results of Experiment 4 imply that the choice satisfaction augmenting effect of oral choice expression is mediated by the level of intuition, but only when cognitive Type 2 processing is not externally triggered (H3).

These findings are relevant for both theoretical and practical considerations which are discussed in the subsequent section.

4.9.1 Theoretical Implications

The findings of Study 2 provide several theoretical implications and contributions. To the best knowledge, Study 2 constitutes the first attempt to show that the mere fact in which a choice is expressed influences subjective choice measures (i.e., choice satisfaction). Further, by replicating the finding that oral choice expression augments choice satisfaction in four different experimental set-ups, robustness of the obtained results is provided. It is therefore likely that the obtained findings can be generalized to other choice contexts in which the choice situation provides little information and is characterized by uncertainty and subjective choice outcome. Moreover, by providing two studies featuring important boundary conditions and by executing a moderated mediation analysis this study provides first support for the assumption that the choice satisfaction increasing effect of oral choice expression is caused by the absence of a reflective style of decision making (i.e., Type 2 processing).

As such, this study not only provides valuable new insights for the considerably new field of investigating choice expression modalities, but also implies valuable new insights in the field of dual processing theory and the experimental induction of reflective mind sets and decision styles (e.g., Type 2 processing). First, in line with insights from the field of neuroscience, an entirely new method for Type 2 processing induction was developed. That is, it was conjectured that altering auditory feedback of one's own voice induces a reflective decision style. The results of Experiment 3 provide initial proof that this manipulation works as intended and that altering auditory feedback is yet another method to experimentally manipulate Type 2 processing (e.g., Toplak/West/Stachovich 2011). Moreover, by conflating existing research investigating the impact of information disfluency on cognitive processing, this study is to the best knowledge the first attempt to give a comprehensive overview of the existing procedures applied to create information disfluency by means of different font styles. Based on this overview and a controlled pretest, this study recommends the usage of 'Times New Roman 12p' as easy-to-read, fluent and 'Mistral 10p' as difficult-to-read, diffluent font to manipulate the type of mental processing.

4.9.2 Practical Implications

Expressing choices through different modalities is very common nowadays, but research investigating the potential impact of different choice expression modalities on decision and

choice is still scarce (e.g., Klesse/Levav/Goukens 2015). Study 2 was intended to provide more insights in the field of choice expression modalities and showed empirically that in choice situations comprising little information and choice uncertainty, choice satisfaction is enhanced when choices are expressed orally compared to when they are expressed manually. This finding is particularly interesting considering that many everyday choices comprise a certain amount of uncertainty (e.g., Kwak/Duvvuri/Russell 2015). For instance, consider an individual choosing between two pineapples that appear to be identical. Whether a pineapple is ripe or not can only be readily assessed after cutting it (e.g., Moyle et al. 2004). Thus, while making the choice the individual has little information about ripeness and thus the quality of the choice option. Further, even after cutting only one of the pineapples, one cannot say whether the other one might have been the better or worse choice. Thus, this choice situation comprises two (or more) ostensibly different, but similar options for which the objective quality is infeasible to assess. The results of Study 2 imply that in this 'fruit choice situation' consumers are likely to be more satisfied with their choice when they express their choice orally compared to when they express it manually. This argumentation might explain why customers at farmer's markets (oral choice expression) appear to be more satisfied with their chosen vegetables than customers in supermarkets, although objectively the quality of the products is very similar (e.g., Wolf/Spittler/Ahern 2005). More generally, the obtained results imply that choice satisfaction in uncertain situations can be augmented when individuals express their choices orally. Marketers (for instance Coca Cola) could use this knowledge and launch a campaign in which for example the slogan 'I take Coke' is used. Consumers might recall the slogan and quietly repeat it while making their choice. In other words, they would then utter their choice orally and would thus probably perceive higher levels of choice satisfaction.

4.10 Limitations

Although the obtained results are in line with the developed hypotheses and initial findings were repeatedly replicated, there are still some limitations to this research that might be interesting avenues for future research. First, as a methodological issue one has to admit that the experiments featured a fairly high share of participants that had to be excluded from the sample. The reason for this high amount can be explained by at least three reasons: First, as

the experiments (except for Experiment 1 (a)) were conducted as field experiments, the incentive to precisely follow the guidelines and instructions was fairly low. As a result, the sample always included at least some 'free-riders' that just wanted the reward (e.g., the free Cola) without the intention to provide correct or any data at all. Second, because it was assumed that the provision of too much or too detailed information might trigger a reflective decision style (i.e., Type 2 processing), as few as and as simple as possible instructions were provided. As a result, information and guidelines were not presented in detailed and replicative terms and some participants might just have overseen important instructions unintentionally. Finally, since the experimental set-up was generally intended to assure a rigorous hypotheses testing, it might have appeared slightly artificial to at least some participants. For instance, some participants might have found it odd to answer questions about their choice without trying it first (e.g., choice satisfaction). Thus, if they did not read the instructions thoroughly enough they might have consumed immediately after they were handed their chosen item as this would be a most straight forward action in a 'tasting study'.

Although all incorrect actions of participants were noticed and noted and the exclusion procedure always followed the same strict guidelines and additionally all data of excluded participants were never considered, the fairly high number of excluded participants is a problem that might be addressed by further research approaches and different methods. In this context it is noteworthy to mention that the replication of the obtained results requests a very thoroughly procedure and experimental execution, as all factors that influence the fluency of choice expression potentially attenuate the desired effect.

A more general limitation of this Study 2 is the fact that only choice situations comprising little information, choice uncertainty, and subjective outcome were under investigation. Although, these situations are theoretically relevant as they allow more rigorous hypothesis testing, and are also practically reasonable (as outlined in section 4.9.2), one might oppose whether the obtained results also hold for other decision or choice situations. Particularly, one might ask the question which decision style and thus which choice expression modality might augment choice satisfaction if the choice situation does involve sufficient information. Although some studies imply that in these situations individuals make better choices when they engage in Type 2 processing and deliberate about the provided information (e.g., Dijksterhuis et al. 2006) and are sequentially also more satisfied with their deliberation based choices, one could also argue that an intuitive mindset might always result in higher

satisfaction, because the mere fact of 'thinking' compared to 'not-thinking' might deflate satisfaction (e.g., Wilson/Schooler 1991). The determination whether a reflective or reflexive mindset and thus a manual or oral modality of choice expression augments choice satisfaction in situations comprising sufficient information, little choice uncertainty and an ORC is left to future research.

Finally, although the variable 'choice satisfaction' is an important antecedent for overall product or service satisfaction and therefore also highly relevant for practical concerns (see Heitmann/Lehmann/Herrmann 2007; Zhang/Fitzsimons 1999), one might argue that the construct 'choice satisfaction' represents a rather theoretic concept and accordingly that insights might only possess value for theoretical considerations. Although other factors, such as consumption or taste satisfaction (Heitmann/Lehmann/Herrmann 2007), product liking (Landwehr/McGill/Herrmann 2011), or product enjoyment (Just/Sigirci/Wansink 2014) might admittedly be concepts that are more relevant for practical concerns, it was argued that the assessment of choice satisfaction allows the deduction of more rigorous conclusions from the obtained results (see chapter 2.1.3). In other words, in contrast to those more practically relevant variables, choice satisfaction can be assessed prior consumption and is independent from any consumption related artifacts (e.g., some like their Cola served cold, some prefer room temperature) (e.g. Fassnacht/Schmidt/Pannek 2015). Nonetheless, to rule out any doubts about the practical relevance of the findings of Study 2 a final fifth post-hoc experiment was conducted.

4.11 Post-hoc Experiment 5 'Cola Study, Liking, Consumption Satisfaction and Consumption Enjoyment'

To address the previously raised potential problem of inappropriate practical relevance of the obtained results in Study 2, Post-hoc Experiment 5 was conducted as an exact replication of experimental set-up of Experiment 1 (b). However, instead of assessing choice satisfaction prior consumption, participants were instructed to taste their chosen cup immediately and were then asked to indicate how satisfied they are with the taste (a), how much they enjoyed the consumption (b), and how much they liked the cola they choose (c). It was conjectured that oral choice expression has an immediate positive effect on these more practically relevant variables.

Accordingly, for the Post-hoc Experiment 5 the following hypothesis is defined:

H4: Oral choice expression modality (i.e., 'speaking') leads to higher levels of taste satisfaction with (a), consumption enjoyment of (b), and liking of (c) the chosen item compared to a manual choice expression modality (i.e., 'taking').

4.11.1 Method

Post-hoc Experiment 5 was conducted on campus on two days (Wednesday and Friday; from 9:30 am to approximately 2:00 pm) as single factor between subject design. All individuals walking by were invited to participate in exchange for a free cup of Cola. The sample comprised one-hundred-nineteen individuals (Male = 51.3%, M_{Age} = 22.08 years, SD_{Age} = 2.44).[12] As manipulation approximately half of the participants was instructed to express their cup choice orally (i.e., by saying the position of the cup, 'oral choice condition', N = 60), while the other half was instructed to express their choice manually (i.e., by taking one cup, 'manual choice condition', N = 59). The experimental procedure was identical to Experiment 1 (b) except for the fact that participants were instructed to taste their chosen Cola before answering any question in the questionnaire. After consumption, participants were asked to indicate their 'taste-satisfaction' with their Cola (i.e., '*Please rate how satisfied you are with the taste of the Cola you choose*' on a '1 = very unsatisfied' to '10 = very satisfied') and how much they liked it (i.e., '*I like the Cola I chose*' on a '1 = I strongly disagree' to '7 = I strongly agree' Likert scale). Further, a subscale of 'the taste experience enjoyment scale' by Just et al. (2014) to measure 'consumption enjoyment' (e.g., '*The Cola tasted really great*', '*The Cola was very satisfying*', and '*The Cola was very enjoyable*' all assessed on '1 = I strongly disagree' to '7 = I strongly agree' Likert scale) was included. Finally, also 'choice satisfaction' after consumption (i.e., CS-Index) and relevant demographic variables were measured.

[12] Three individuals refused to indicate any demographic information. In total 6 individuals were excluded from the analysis due to wrong modality of choice expression.

4.11.2 Results

In line with H4a, participants expressing their choice orally were more satisfied with the taste of their chosen Cola (M_{Oral} = 7.12, SD_{Oral} = 2.2) than were participants expressing their choice manually (M_{Manual} = 6.24., SD_{Manual} = 2.4, F(1, 117) = 4.29, p = .04, Cohen's d = .38). Further in line with H4b, participants expressing their choice orally also liked their chosen Cola more (M_{Oral} = 5.02, SD_{Oral} = 1.51) than did participants expressing their choice manually (M_{Manual} = 4.42., SD_{Manual} = 1.58, F(1, 117) = 4.38, p = .039, Cohen's d = .39).

To test H4c, a 'consumption-enjoyment' composite scale (α = .96) was created. Participants expressing their choice orally enjoyed their chosen Cola significantly more (M_{Oral} = 4.89, SD_{Oral} = 1.39) than did participants expressing their choice manually (M_{Manual} = 4.17, SD_{Manual} = 1.56, F(1, 117) = 7.18, p = .008, Cohen's d = .49). These results are displayed in Figure 20 (black lines indicate standard errors of the means).

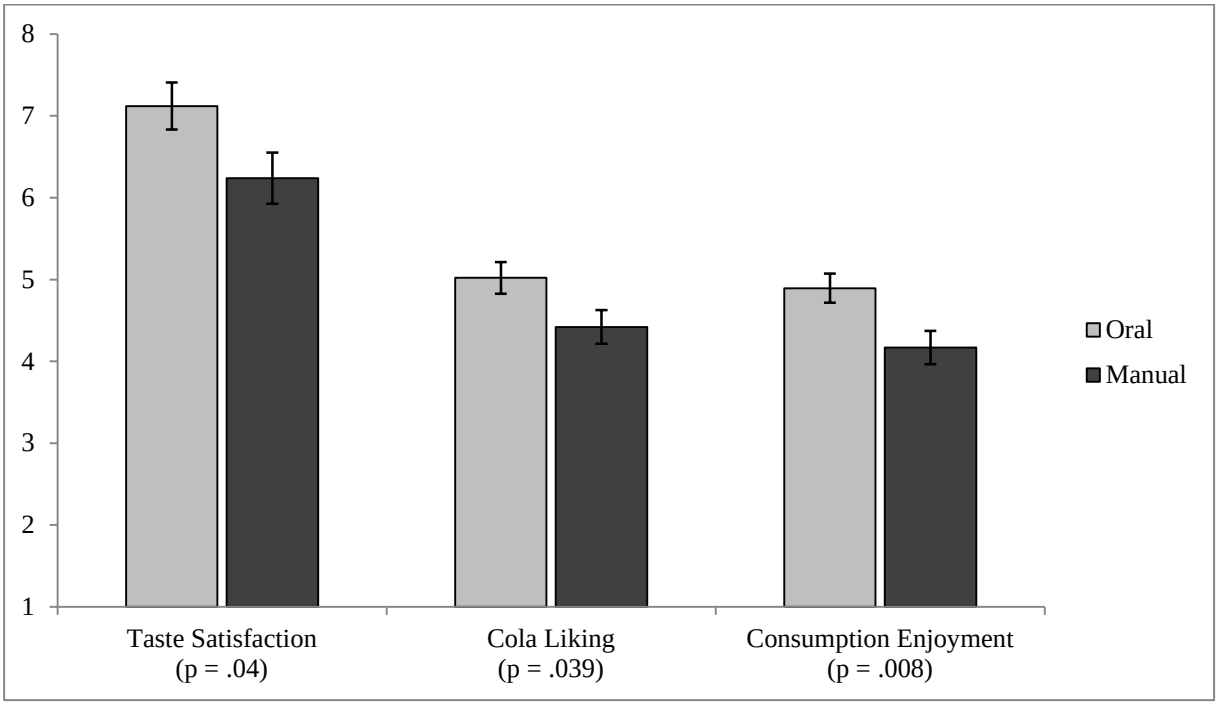

Figure 20: Results Post-hoc Experiment 5, Study 2

Finally, also the CS-Index (α = .97) was assessed. The results indicate in line with previous results that participants expressing their choice orally (M_{Oral} = 5.17, SD_{Oral} = 1.28) were more satisfied with their choice than were participants expressing their choice manually (M_{Manual} =

4.27, SD_{Manual} = 1.6, $F(1, 117) = 11.53$, $p = .001$, Cohen's d = .62). Note that in Post-hoc Experiment 5 choice satisfaction was assessed *after* consumption and that choice satisfaction was positively correlated with taste-satisfaction ($r = .84$, $p < .0005$), Cola-liking ($r = .83$, $p < .0005$), and consumption enjoyment ($r = 85$, $p < .0005$).

4.11.3 Discussion Experiment 5

The results of Post-hoc Experiment 5 further strengthen the practical relevance of the initial findings and address one potential limitation of Study 2. It was observed that participants who expressed their choice orally were more satisfied with the taste of their chosen cola (H4a), liked it more (H4b), and enjoyed its consumption more (H4c) compared to participants who expressed their choice manually. In addition, it was revealed that taste satisfaction, cola liking, and consumption enjoyment are all highly and positively correlated with choice satisfaction. The high correlation between these measures further supports the importance of choice satisfaction being a practically highly relevant measure. Importantly, the results of Post-hoc Experiment 5 also support the assumption, that choice satisfaction is a more rigorous measure independent from external and internal factors. Rephrased, in all experiments (e.g., 1 (a) 'Paper Stack', 1 (b) 'Cola', 2 'Nougat', 3 'Headphone/Cola', and 4 'Cognition/Cola') participants were additionally asked about the general liking of the offered products in the demographics part of the questionnaires. These results were not reported, because they were inconclusive and did not significantly influence the main effects. However, in the post-hoc Experiment 5, the dependent measures, including the assessment of choice satisfaction after consumption, were highly correlated with pre-existing preferences. For the other experiments of Study 2 no such relation could be detected (see Table 9). Thus, the results of Post-hoc Experiment 5 do not only support the practical relevance of Study 2, but also confirm the initially conjectured theoretical robustness of the assessment of choice satisfaction in comparison to any other satisfaction measure.

Exp.	Control	DV	Correlation with DV
1 (a)	1. 'to me it did not matter which task (A or B) I picked' 2. 'I like word puzzles in general'	CS-Index	1. r = -.06, p = .6 2. r = .11, p = .35
1 (b)	1. 'I am very convinced that I picked the brand Cola' 2. 'I am very convinced that I picked the private label Cola' 3. 'Generally, I like Cola'	CS-Index	1. r = .006, p = .93 2. r = .013, p = .86 3. r = -.08, p = .27
2	1. 'I am very convinced that I picked the brand Nougat Cream' 2. 'I am very convinced that I picked the PL Nougat Cream' 3. 'I like Nougat Cream in general' 4. 'Generally, I think that Nutella tastes better than any No-Name Nougat-Cream.' 5. 'I have a clear preference for Nutella Nougat-Cream.'	CS-Index	1. r = .12, p = .11 2. r = -.08, p = .25 3. r = .16, p = .03** 4. r = .05, p = .52 5. r = .03, p = .69
3	1. 'I am very convinced that I picked the brand Cola' 2. 'I am very convinced that I picked the PL Cola' 3. 'I like Cola in general' 4. 'Generally, I think that Coca Cola tastes better than any No-Name Cola.' 5. 'I have a clear preference for Coca Cola.'	CS-Index	1. r = .09, p = .3 2. r = -.09, p = .26 3. r = -.11, p = .2 4. r = .03, p = .73 5. r = .097, p = .25
4	1. 'To me it did not matter which Cola (Pepsi Cola or Lidl Cola) I picked.' 2. 'Generally, I think that Pepsi Cola tastes better than any No-Name Cola.' 3. Generally, to you prefer Pepsi Cola or Lidl Cola?'	CS-Index	1. r = .03, p = .63 2. r = -.02, p = .78 3. T = -.02, p = .79 (Kendall's tau)
5	1. 'I am very convinced that I picked the brand Cola' 2. 'I am very convinced that I picked the No-Name Cola' 3. 'Generally, I like Cola' 4. 'Generally, I think that Coca Cola tastes better than any No-Name Cola.' 5. 'To me it did not matter which Cola (Coca Cola or Lidl Cola) I picked.'	CS-Index (after consumption)	1. r = .51, p = .000*** 2. r = -.43, p = .000*** 3. r = .2, p = .03** 4. r = .06, p = .55 5. r = .07, p = .48
		Taste Satisfaction	1. r = .49, p = .000*** 2. r = -.42, p = .000*** 3. r = .2, p = .03** 4. r = .13, p = .17 5. r = .05, p = .63
		Liking of chosen Cola	1. r = .5, p = .000*** 2. r = -.41, p = .000*** 3. r = .3, p = .001*** 4. r = .11, p = .22 5. r = -.002, p = .99
		Consumption enjoyment (composite)	1. r = .52, p = .000*** 2. r = -.39, p = .000*** 3. r = .27, p = .003*** 4. r = .08, p = .37 5. r = .05, p = .62

Note: r = correlation coefficient; *** p < .001, ** p < .05, * p < .1

Table 9: Correlation of DV and consumption controls, Post-hoc Experiment 5, Study 2

5 General Conclusion

The point of departure of the present dissertation is grounded in the observation, that although the marketplace offers consumers multiple different modalities to express their choice (i.e., choice expression modality), surprisingly little is known about the potential impact of different choice expression modalities on choice and choice related variables so far. Particularly, as most daily choices are either expressed manually (e.g., by taking an item or by some sort of action that involves clicking or pushing) or orally (e.g., by talking to another person), the focus was set on the investigation of oral and manual choice expression modalities.

To close this research gap, the overarching goals of this dissertation were to obtain a better understanding of the presumed impact of oral versus manual choice expression modalities on objective and subjective choice related measures and to gain more insights into the conjectured underlying mechanisms for these phenomena. These research goals were consecutively addressed by the conduction of two empirical studies. For this purpose, the theoretical and conceptual foundations were compiled in Chapter 2. Upon this theoretical and conceptual basis and a comprehensive literature review, three more specified research questions were eventually derived. Because an extensive presentation and discussion of the results as well as the potential practical and theoretical implication of the two empirical studies were already provided in Chapter 3 and Chapter 4, this final Chapter 5 is mainly intended to serve as summarizing evaluation of the research questions developed in section 2.5 and compiles the most central findings of the present dissertation.

The first research question addressed the potential impact of manual and oral choice expression modalities and the likelihood of making an ORC. More specifically it was phrased:

First research question: What is the impact of manual and oral choice expression modalities on the likelihood of making an ORC as proxy for Type 2 processing?

This research question was addressed in three laboratory experiments in the sections 3.5, 3.6, and 3.7 in the context of Study 1 of the present dissertation. More specifically, in these experiments individuals were always presented different choice options. Among these options one constituted an ORC and at least one other item constituted an intuitively appealing, but

objectively inferior choice option. As manipulation, individuals were either instructed to express their choice orally (i.e., by saying which option they would like to choose) or manually (i.e., by taking the item they would like to choose or by pressing a button next to the item). In line with the assumption that only a manual modality of choice expression triggers Type 2 processing and thus higher cognition (e.g., section 3.2.2), the empirical results imply that individuals are more likely to make an ORC if they express their choice manually compared to if they express their choice orally.

Further, in line with the conjecture that manual choice expression induces Type 2 processing which is eventually the cause for the augmented likelihood of making an ORC, the results in section 3.7 indicate that the probability of making an ORC is equally high for orally and manually expressed choices if Type 2 processing is externally trigged by an antecedent unrelated to the modality of choice expression. In other words, the results imply that Type 2 processing can be induced by manual choice expression modalities and oral choice expression modality does not affect default Type 1 processing.

Accordingly, the theoretical implication of Study 1 is two folded. On the one hand, it implies that choice expression modalities have an observable impact on the objective quality of choice and particularly that manual choice expression augments the likelihood of making an ORC. On the other hand, another very important theoretical implication of Study 1 constitutes the insight that manual choice expression modalities likely function as an external antecedent of Type 2 processing.

For practitioners the results of Study 1 imply that the consideration which modalities of choice expression they should offer their customers should not be made randomly, as the specific modalities have an impact on objective choice quality. Although traditional economic theory implies that choices based on rational consideration are always superior compared to choices based on intuition (Denno 2003; Simon 1955; Von Neumann/Morgenstern 2007), there are situations in which intuitive choice elicitation might yield better outcomes (e.g., Novak/Hoffman 2009). Accordingly, practitioners should strategically evaluate whether within the product category of their offered products and services a certain choice outcome is subjective or objective and then adjust the offered choice expression modalities accordingly.

However, as the objective choice quality does not necessarily result in subjective perceptions of choice quality (Schwartz et al. 2002), the second research questions was formulated:

Second research question: What is the impact of manual and oral choice expression modalities on subjective choice satisfaction in a choice situation with subjective outcome?

The sections 4.5, 4.6, 4.7 and 4.8 address this research question in the context of Study 2 of the present dissertation. Research implies that in choice situations in which it is impossible to make an ORC, because little information is available and the choice outcome is uncertain, individuals seem to be more satisfied with an expressed choice if it is based on intuition rather than on thoroughly deliberation (Dijksterhuis et al. 2006; Wilson et al. 1993). Because the results of Study 1 (Chapter 3) imply that oral choice expression does not induce Type 2 processing, and thus individuals retain intuitive Type 1 processing (e.g., Evans 2007), it was conjectured in Study 2 that oral choice expression yields higher levels of choice satisfaction than manual choice expression in situations in which the choice outcome is uncertain and individuals receive little information. In one laboratory experiment (Experiment 1a) and four field experiments (Experiments 1b, 2, 3, and 4) individuals were offered two ostensibly different choice options and asked to choose only one of them. Unknown to the individuals, it was always manipulated whether they were either instructed to express their choice orally or manually. Because choice satisfaction constitutes the most applicable satisfaction measure for the purpose of rigorous hypothesis testing (see section 2.1.3 for an extensive discussion), individuals were asked about their satisfaction with their choice prior consuming or using it. The results imply that indeed oral choice expressions yield higher levels of choice satisfaction than manual choice expression. As important boundary condition and in line with the conjecture that an intuitive processing style (i.e., Type 1 processing) constitutes the underlying mechanism of the obtained results, Experiment 3 and Experiment 4 in section 4.7 and 4.8 respectively, show that oral and manual choice expression yields similar levels of choice satisfaction if Type 2 processing is externally triggered.

From a theoretical point of view, this result is particularly valuable as it further supports the initial assumption that the modality in which a choice is expressed does influence choice and subjective perceptions related to it. Particularly, as the choice situations comprised uncertainty and little information, the obtained effects are independent from any form of preexisting preferences and other external factors. Besides this main theoretic contribution, the methods applied in section 4.7 and 4.8 further add to the research in the field of dual processing theory. More precisely, by inducing Type 2 processing by means of altered auditory feedback, an entirely new method of external cognition induction was developed and

introduced in section 4.7. Although in section 4.8 Type 2 processing was induced by a common and established method of manipulating the fluency of information (Alter/Oppenheimer 2009; Diemand-Yauman/Oppenheimer/Vaughan 2011; Gervais/Norenzayan 2012; Song/Schwarz 2008a), this section comprised to the best knowledge the first comprehensive overview of specific and concrete font disfluency manipulations applied in previous studies. As such Study 2 comprises a first attempt for the provision of objective recommendations for the execution and application of disfluency manipulations for future research.

From a practical point of view, the obtained results imply that yet again the decision which choice expression modalities should be offered to consumers should be a strategic and not a random one. Particularly, when making an ORC is not possible, as it is often the case for various product categories, consumers appear to be more satisfied with their choices when they expressed them orally instead of manually. Because customer satisfaction has a positive direct and indirect impact on various important measures, such as revenue and profit, the consideration of which choice expression modalities to offer might steer corporate success. Additionally, the results indicate that the external induction of Type 2 processing might attenuate the level of choice satisfaction in the specific choice situation when little information is available and an ORC is infeasible. Although this insight has already practical relevance itself, it also directly links to the third research question:

Third research question: Is the impact of manual and oral choice expression modalities on choice satisfaction in a choice situation with subjective outcome mediated by the level of intuitive decision making?

In line with the assumption that an intuitive choice mode due to Type 1 processing is responsible for the observed effect of augmented levels of choice satisfaction, it is reasonable to conjecture that this effect is mediated by the level of intuitive decision making. In other words, this implies for choice situations comprising choice uncertainty and little information, that the more a certain choice is based on intuition, the higher is the level of choice satisfaction. The results of a moderated mediation analyses (Hayes 2012), supports the conjecture that the positive effect of oral choice expression on the level of choice satisfaction is indeed mediated by the level of intuitive decision making.

These findings further support the theoretical conjecture that oral choice expression is related to intuitive decision making. As such, it adds to the insights on the underlying mechanisms for why manual and oral choice expression modalities impact choice differently. Additionally, it implies that intuitive decision making augments choice satisfaction in choice situations with little information and choice uncertainty (Wilson et al. 1993). Although previous studies implicitly support this connection, the focal study is one of the first that provides explicit support.

Detached from the insights about choice expression modalities, this finding is very essential from a practical point of view as it implies that an intuitive mindset increases the subjective quality of choice if the outcome of a choice is subjective. Considering that the outcome of most consumer choices is subjective, because products within a certain product category often comprise very similar features and the objective performance does not significantly differ (Batra et al. 2000; van Rompay/Fransen/ Borgelink 2014), marketers might therefore increase customer satisfaction by simply impeding the induction of Type 2 processing. This implies that the usual practice of offering a huge amount of information and providing comparisons with competitive products (Kivetz/Simonson, 2000; Lee/Lee 2004) might be a disadvantageous for ordinary consumer products. However, whether this finding can be generalized and whether this finding remains robust in different choice setting is left to future research.

In conclusion, the present dissertation constitutes an important step towards the investigation of the impact of different modalities of choice expression on the objective and subjective quality of choice. The empirical results imply that the manual choice expression can increase the likelihood of making an ORC if the choice outcome is objective and that oral choice expression can increase choice satisfaction if the choice situation comprises uncertainty and little information. According to these findings, marketers but also researchers are invited to strategically assess which modalities of choice expression might yield optimal outcomes for a given choice situation.

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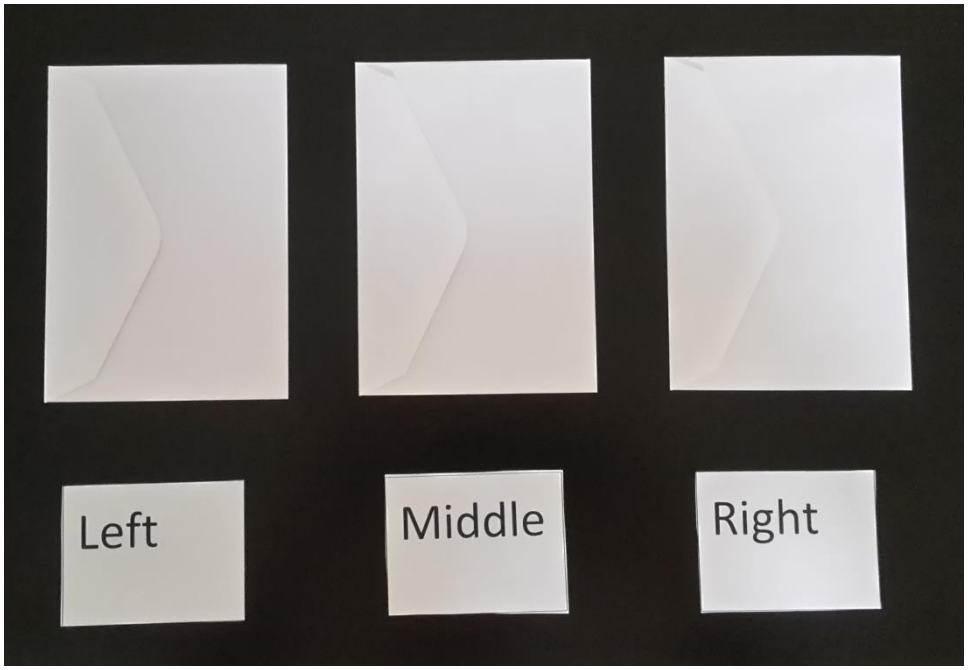
General Appendix

I

Experimental Material Experiment 1 (Monty Hall Game), Study 1



Picture 1: Envelopes in the Monty Hall Game

III

Experimental Material Experiment 2 (CRT), Study 1

Please choose the correct answer to the following questions. Please read the questions carefully and then decide which answer is correct **by taking the small piece of paper with the letter** of the correct answer.

1.) A bat and baseball cost $1.10 in total. The bat costs 1 dollar more than the ball. How much does the ball cost?

A	**B**	**C**	**D**	**E**	**F**
2 cents	5 cents	10 cents	15 cents	20 cents	50 cents

2.) If it takes 5 machines 5 minutes to make 5 products how long would it take 100 machines to make 100 products?

A	**B**	**C**	**D**	**E**	**F**
5 min.	10 min.	20 min.	50 min.	100 min.	105 min.

3.) In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half of the lake?

A	**B**	**C**	**D**	**E**	**F**
12 days	17 days	22 days	24 days	36 days	47 days

IV

Experimental Material Experiment 2 (Syllogism reasoning Task), Study 1

In this task you must suppose that the two premises are true and you have to limit yourself only to the information contained in these two premises. This is very important.

Please read the questions carefully and then decide which answer is correct *according to the two premises* **by saying the letter** of the correct answer to the Research Assistant.

1.)

Premises: ***1.) All Europeans are blonde.***

2.) Mr. X is blonde.

Conclusion: ***Mr. X is European.***

A	The conclusion **does not** follow logically from the premises
B	The conclusion follows logically from the premises

2.)

Premises: ***1.) All persons in group 1 are smart.***

2.) Mr. X is in group 1.

Conclusion: ***Mr. X is smart.***

A	The conclusion **does not** follow logically from the premises
B	The conclusion follows logically from the premises

3.)

Premises: ***1.) All mammals walk.***

2.) Whales are mammals.

Conclusion: ***Whales walk.***

A	The conclusion follows logically from the premises
B	The conclusion **does not** follow logically from the premises

4.)

Premises: ***1.) All things that have a motor need oil***

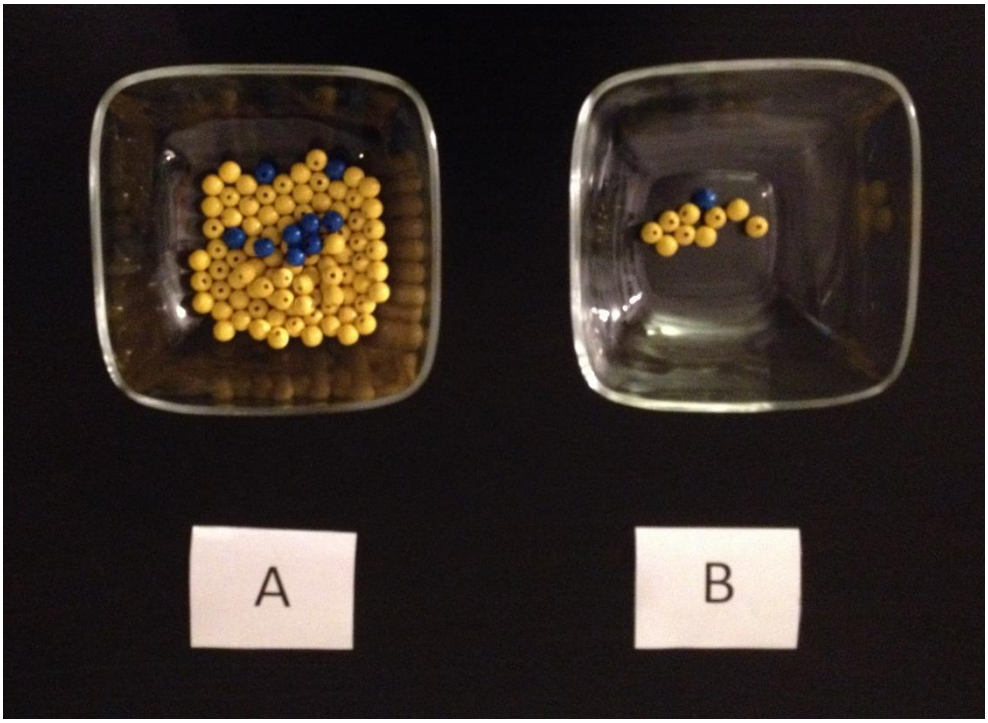
2.) Automobiles need oil

Conclusion: ***Automobiles have motors.***

A	The conclusion follows logically from the premises
B	The conclusion **does not** follow logically from the premises

V

Experimental Material Experiment 3 (RBP 'Marble Choice Experiment), Study 1



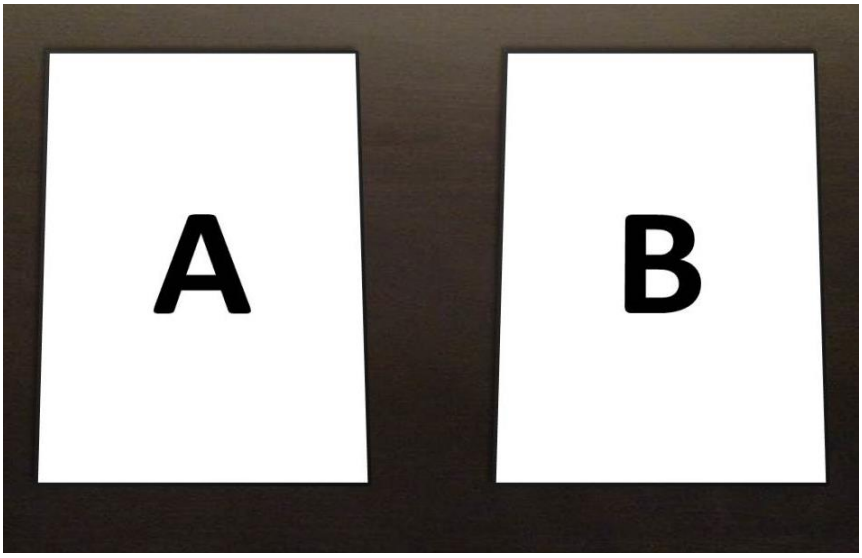
Picture 2: Small and Large Bowls containing Marbles

Fraction	Correct Answer	Share of Participants indicating Correct Answer
$\frac{9}{27}$	33.33%	59.5%
$\frac{18}{200}$	9%	63.5%
$\frac{4}{16}$	25%	73.0%
$\frac{1}{30}$	3.33%	52.7%
$\frac{10}{100}$	10%	78.4%

Table 10: Experiment 3, Study 1, Fraction-solving (Appendix)

VI

Experimental Material Experiment 1a (Paper Stack Experiment), Study 2



Picture 3: Paper stacks placed next to each other (graphical facsimile)

VII

Experimental Material Experiment 1b (Cola Study), Study 2

Picture 4: Cola cups placed next to each other including position signs

VIII

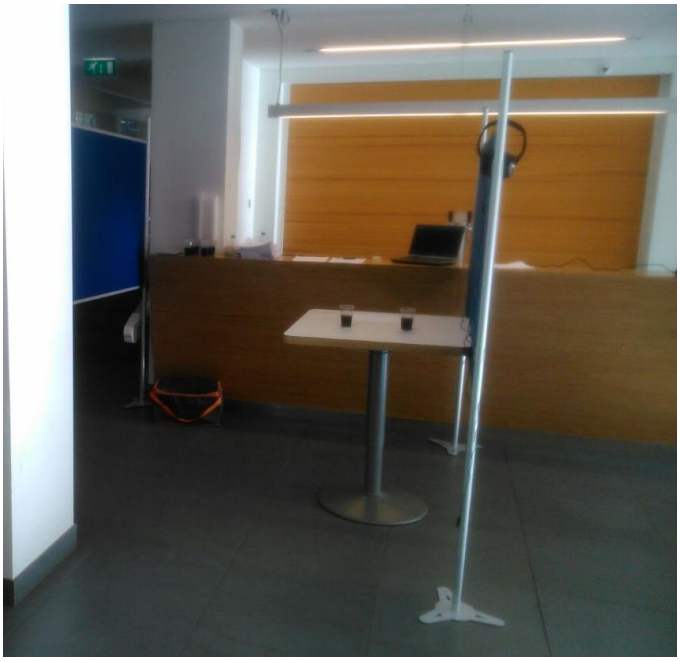
Experimental Material Experiment 2 (Nougat Study), Study 2

Picture 5: Nougat samples placed next to each other including position signs (German) for decisions expressed orally or by taking

Picture 6: Nougat samples placed next to each other including position signs (German) for decisions expressed by button pressing

IX

Experimental Set-up Experiment 3 (Headphone/Cola Experiment), Study 2



Picture 7: Display of the experimental set-up

Picture 8: Headphones BOSE QuietComfort 25

X

Experimental Material Experiment 4 (Cognition/Cola Experiment), Study 2

Picture 9: Cola cups placed next to each other including position signs (German)

XI Additional Statistics

	Manual (N = 44)	**Oral (N = 44)**	**z-value**	**Mann-Whitney U**
Correct answers	Md = 1	Md = 0	3.64 (p = .000)	566
Intuitive answers	Md = 2	Md = 2	2.85 (p = .004)	642

Table 11: Experiment 2, Study 1, CRT: Non-parametric results (Appendix)

	Manual (N = 44)	**Oral (N = 44)**	**z-value**	**Mann-Whitney U**
Correct answers	Md = 4	Md = 3	2.97 (p = .003)	642

Table 12: Experiment 2, Study 1, Syllogism: Non-parametric results (Appendix)

Comparison (IV)	Without control	NFC	FI	Intention to win	RBP
ML vs. OL	p = .036	a: p = .02 b: p = .06	a: p = .037 b: p = .94	a: p = .034 b: p = .35	a: p = .029 b: p = .36
MH vs. OH	p = .63	a: p = .62 b: p = .59	a: p = .63 b: p = .91	a: p = .76 b: p = .02	a: p = .66 b: p = .39
ML vs. OH	p = .48	a: p = .51 b: p = .51	a: p = .49 b: p = .87	a: p = .49 b: p = .35	a: p = .53 b: p = .48
ML vs. MH	p = .24	a: p = .25 b: p = .44	a: p = .22 b: p = .76	a: p = .26 b: p = .56	a: p = .21 b: p = .29
OL vs. OH	p = .006	a: p = .005 b: p = .12	a: p = .006 b: p = .68	a: p = .005 b: p = .013	a: p = .005 b: p = .13
OL vs. MH	p = .002	a: p = .001 b: p = .09	a: p = .002 b: p = .91	a: p = .002 b: p = .014	a: p = .002 b: p = .48

Table 13: Experiment 3, Study 1: Main effect with and without controls (Appendix)

Description Table 11:

P-values obtained from binary regression: Effect of conditions (IV) on DV (i.e., ORC; choosing the small bowl), controlling for NFC, FI, ‘Intention to Win’ and ‘RBP knowledge’, respectively; a = effect of IV on DV with control, b = effect of control on DV.

IV: M = *Manual*, O = *Ora*l, L = *Low cognition*, H = *High cognition*

	Coefficient Speaking (S)	Coefficient Button (B)	Coefficient Taking (T)	DF	P-value
Contrast code 1: Speaking vs. Taking and Button	1	-.5	-.5	112.63	.006
Contrast code 2 Speaking vs. Button	1	-1	0	121.91	.041
Contrast code 3: Speaking vs. Taking	1	0	-1	124.18	.005
Contrast code 4: Button vs. Taking	0	1	-1	123.22	.33

Table 14: Experiment 2, Study 2: Contrast codes coefficients and results for adjusted DF (Appendix)

Akademischer Lebenslauf — Thorsten Voß

09/2013 - 03/2016:	**Promotion** Dr. Werner Jackstädt Endowed Chair of Sales and Services Marketing, Universität Mannheim Abschluss: Dr. rer. pol.
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10/2007 - 09/2010:	**Bachelorstudium** RWTH Aachen, Business Administration Abschluss: Bachelor of Science
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